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Electric Railway Journal

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Getting the Most from the Index

This is essentially a subject index, not an index of titles, and articles treating a number of different subjects are listed under each of them. In addition, a geographical reference is published wherever the article relates to any particular railway company, city, state or nation. Entries about an electric railway are under the name of the city in which the main office of the company is located, but in the case of electrified sections of steam railroads, the entries appear under the name of the railroad.

In the subject index, the alphabetical method is followed. If there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below is a list of the common keywords used in the index to this volume. This list has been subdivided for convenience into fourteen general subjects.

The headings which appear in the index itself are in small type under the general classifications. The main headings in capitals below do not appear in the index. The list of keywords is revised from time to time

to keep the index abreast with developments.

As an example of how to use the index, if a reader wishes to locate an article on special trackwork he obviously would look in the list below at the general subject "Track." Under this caption, only "Special trackwork" could apply to the article in question. The reader would therefore refer to this keyword under S in the body of the index.

In addition to the groups of articles covered by these headings, papers and reports from railway associations are grouped under the names of the various organizations. Proceedings of other associations and societies are indexed in general only in accordance with the subject discussed. Short articles about machine tools appear only under the heading "Repair shop practice; shop methods and equipment" and are not indexed alphabetically, because there is a wide choice in most cases of the proper keyword to be used.

Signed articles also are indexed by the name of the author. When the name of the author is known to the reader this provides the simplest method of locating any article.

CLASSIFIED LIST OF KEYWORDS

ACCIDENTS AND ACCIDENT PREVENTION

Accident claim department
Accident prevention
Accidents (including wrecks)
Insurance, Fire
Safety work
Storm and fire damage

ELECTRIC CARS AND SERVICE CARS

Cars (including car design)
Locomotives
Service and tower trucks
Trackless trolley

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Gears and pinions
Heaters, electric
Lighting and lighting fixtures
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Seats
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Appraisal of railway property
Blanks and forms
Discontinuance of lines
Financial (methods of financing)
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Insurance and pensions
Legal
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Market conditions
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Lubrication
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Track construction
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Abbreviations: *Illustrated, c Communications.
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Annual Statistical Number

ELECTRIC RAILWAY JOURNAL

McGraw-Hill Company, Inc.

January 2, 1926

Twenty Cents per Copy

*The sun never
sets on*

"Bridgeport"
BRASS
TRADE CO. MARK
Phono-Electric

*See Advertisement inside
"From Tampa To Turkey"*

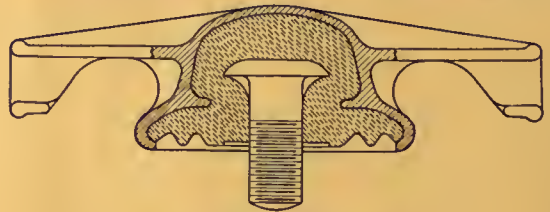
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Suspensions



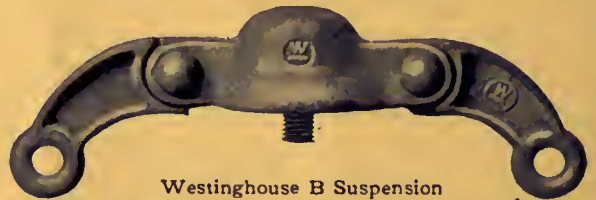
Westinghouse B Suspension
Styles 227032 and 227037
Straight Line



Showing method of holding stud
in body of B suspensions with
special insulating compound



Westinghouse B Suspension
Style 227144—Single-Curve with Arm



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Style 300814, Straight-Line

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East Pittsburgh Pennsylvania
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1926

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No. 1

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Railways Plan to Spend \$296,000,000 for Plant and Material in 1926	5
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Issues of Merit Easy to Sell	13
Total financing in 1925 not large compared with recent years, but companies with good operating records experienced no difficulty in finding a market for their issues at reasonable rates. Need is im- perative for recasting many financial structures.	
Track Extensions Show Substantial Gain Over Previous Years	15
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Car Purchases During 1925 Were Below Requirements	19
Reduction in the number of new cars ordered this year emphasizes the importance of directing increased attention to replacement of obsolete equipment. New England was the only section reporting increased purchases over last year.	
34 per Cent of Passenger Cars Are Over Twenty Years Old	25
Less than half of all cars now in electric railway service were purchased in the last fifteen years. Greater number of new cars are needed to modernize industry than was anticipated. Nation- wide survey more than confirms previous estimates.	
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Many projects completed, both in this country and abroad. In- creasing attention is being paid to electric operation on trunk lines.	
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More companies inaugurated bus service during the past twelve months than in any previous year. The number of buses oper- ated more than doubled. Purchases of new equipment were greater than ever before.	
Electric Railway Costs and Fares Continue Stable in 1925	37
By ALBERT S. RICHEY. Only a few points variation has occurred in major index figures during the year. Discussion of trends indicates stability for com- ing year. Several changes in method of computing figures.	
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We Thank You!

ONCE more a new year is dawning. With it comes another Annual Statistical Number, with a wealth of information regarding the doings of electric railways in the past year, and a forecast of the one just begun. Collection of this material has been the main work of the editors ever since the October convention. The information this year is believed to be more complete, more accurate and more authoritative than ever before.

The editors alone could not have produced this issue. It has taken the assistance of practically every operating railway and holding company, and the manufacturers as well, to supply the information on which the tables, charts and text are based. Thousands of letters and hundreds of telegrams have been sent out and replies received in the process of collecting and verifying the data. Manifestly it is impossible to send acknowledgment in each individual case.

The data presented will be of inestimable value to the industry. We are glad to have been of service in preparing and publishing it. And we desire to thank publicly all who have assisted us in the preparation of this issue.

And to each one in the industry let us express the wish that for you it will be a happy and a prosperous New Year.

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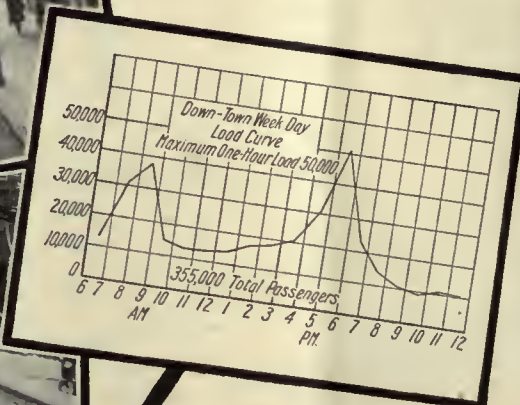
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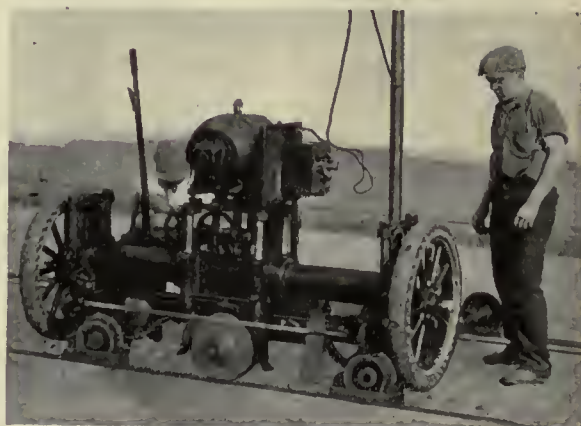
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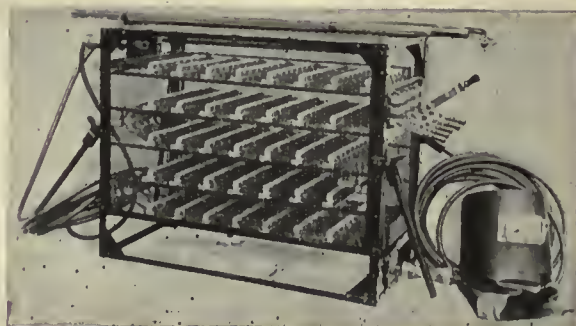
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"Atlas" Rail Grinder



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"Ajax" Electric Arc Welder



Route—1926

Destination—PROSPERITY

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Insulating Materials
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Employees' Badges
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Employees' Badges
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Control!

Safety Car Devices

*Our wish
for you—*
A PROSPEROUS
NEW YEAR



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Those who run the cars will be benefited by a less arduous and more interesting job.

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a prosperous
NEW YEAR



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WESTINGHOUSE TRACTION BRAKES

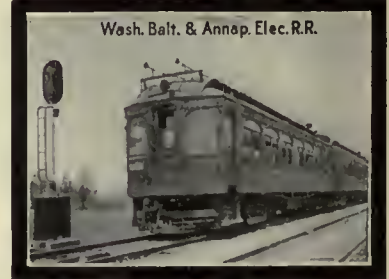
Signals

and their Diversified Applications.

Have you more than scratched the surface to uncover available means of protecting and speeding up your traffic, and are you experiencing delays or perhaps accidents which might be eliminated by the use of one or more of the following means?



1.—Automatic semaphore or color light block signals, controlled by continuous track circuits.



2.—Electro-pneumatic, electric, electro-mechanical, or purely mechanical interlocking systems at terminals or at grade crossings with other railway lines.



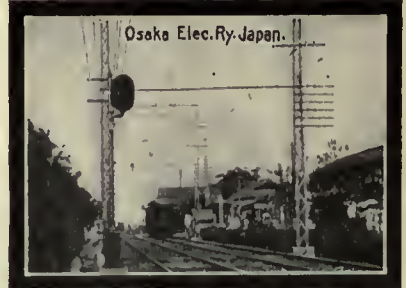
3.—Highway crossing protective devices of flashing color light, wig-wag and audible types or combination of same.



4.—Remotely controlled switches at outlying sidings.



A statement of your problem places you under no obligation and if it appears to our engineers that your conditions can be improved by installation of our materials, we shall be glad to furnish complete details.



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Mark

Union Switch & Signal Co.

SWISSVALE, PA.



Mark



New Year's Greeting

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The Westinghouse Air Brake, long recognized as an essential economic factor in transportation by rail, is now proving to be a safety and time-saving device for automotive vehicles which has the potentiality to vitally assist highway transportation in attaining its rightful place of usefulness and efficiency.

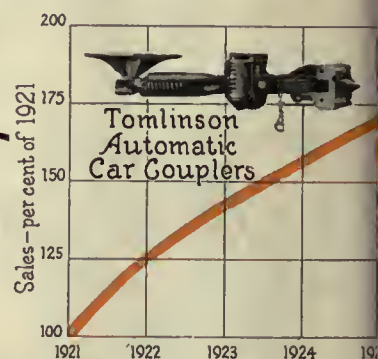
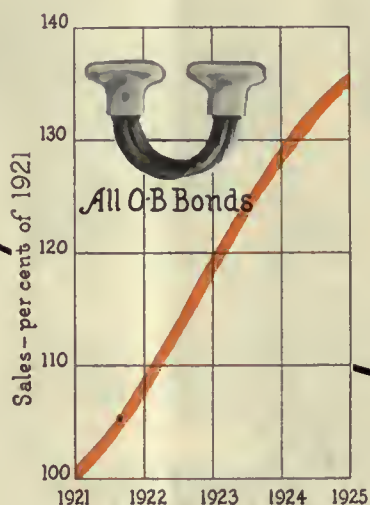
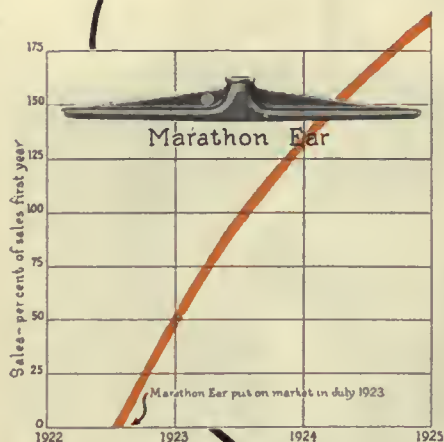
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Automotive Division
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WESTINGHOUSE
Automotive AIR BRAKES



Merit Alone



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Ohio

Draws Such Curves

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Iowa Southern Utilities Co.
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Department of Street Railways (Detroit)
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Phono-Electric knows no geographical limits. As shown by the partial list at the right, this quadruple-wear wire is installed on prominent electric railways everywhere. Europe, Africa and even Australia know it and use it.

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Bulletin just off the press awaits your request



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An "exquisite" job!—

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One word defines the MACK Parlor Car Bus—EXQUISITE

It is a word that may be coupled with the sturdy Mack design, and yet lose nothing by association, for in the Mack Parlor Car Bus beauty of correct line and proportion blend with sturdy construction to produce a real achievement.

In the presentation of this Mack job, it is only natural that the oldest chassis builder should join with the oldest body builder; each giving the ultimate of engineering skill and long experience. The result is apparent to passengers and owners. For luxury and security—for smooth, swift and steady roadability and high-class distinguished appearance—the Mack is in a distinct class. Passengers seated as luxuriously as they are in the Mack Parlor Car Bus, and surrounded on every side by beautiful appointments contributing toward their comfort, become satisfied patrons and steady riders.

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After tests extending over the last twenty-four months with many makes of motor buses, the Public Service Railway Company of Newark, New Jersey, have

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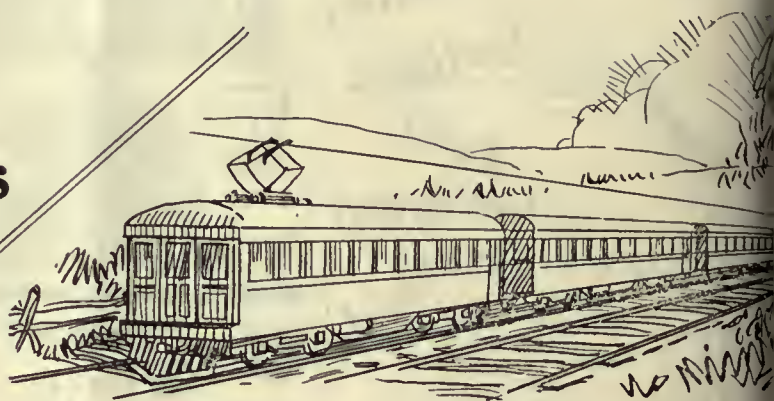
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NEW cars attract new riders while they speed up operation and reduce costs.

National Pneumatic Equipment should, of course, be used to operate the doors and steps in every modern type of car. When you plan new cars, call for a National Pneumatic Engineer to suggest the most practical and efficient method for controlling doors and steps.

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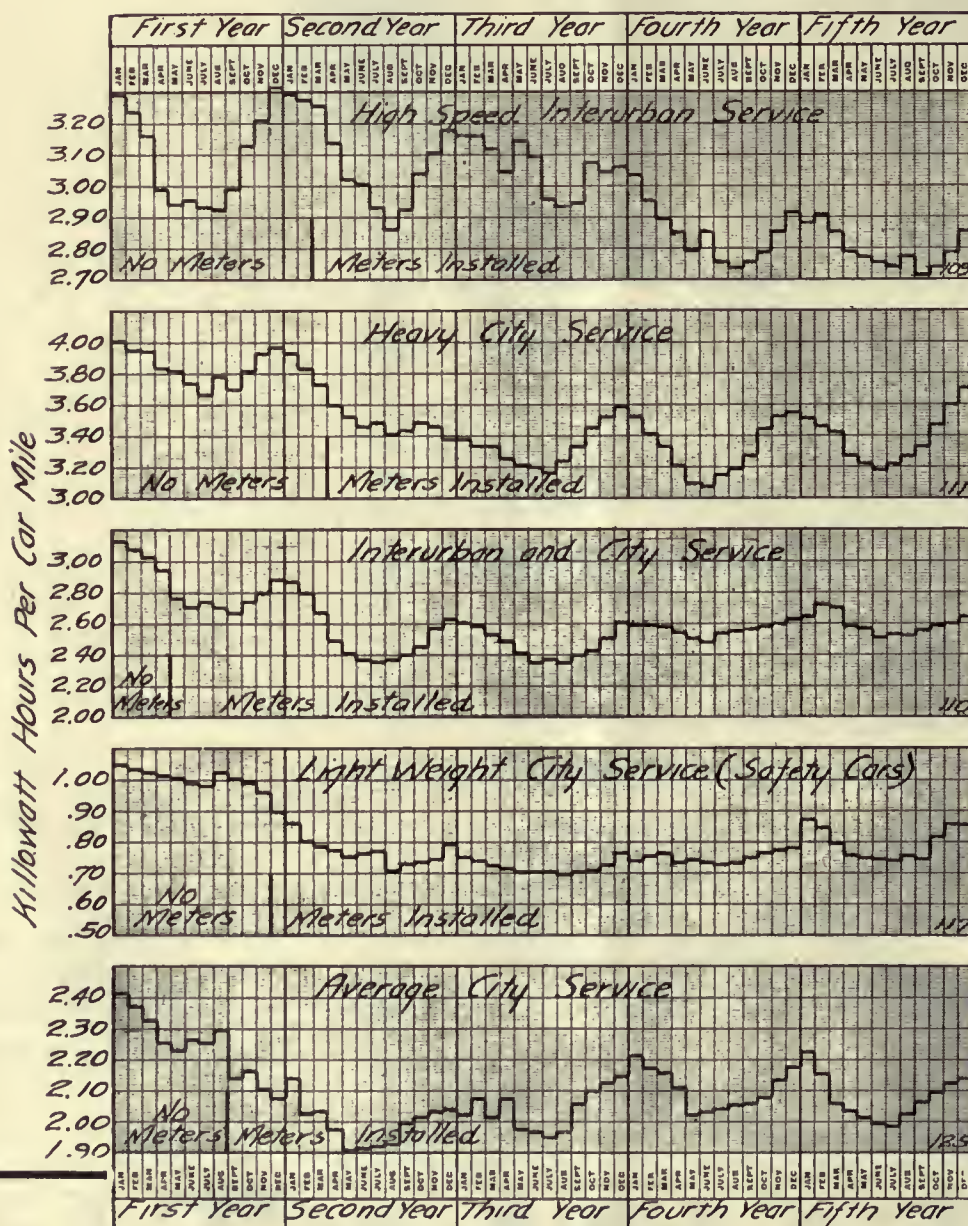
PNEUMATIC

Cumulative evidence of 25 years

—5 Roads—5 Years—

Below are curves showing the average system energy consumption for five well-known electric railways. Note the downward slope in each case from the high year before to the lower years since the installation of "Economy Power-Saving Car Meters."

Names of roads and particulars of installations will be supplied on request.



22,000

Metering Energy Saves Energy and Equipment

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ARS EQUIPPED IN THE U. S. A.

In the five cases cited more than 10 per cent saving has been made and maintained. This represents a saving, depending upon power costs, of \$75 to \$200 per car a year — more than enough to pay for the meters in less than the first year of operation.

All this is gained notwithstanding increases in speed and in traffic and street interference.

Dials on Economy Meters also provide for making mechanical and electrical car inspections on a basis of kilowatt hour readings rather than on time or mileage. This makes the inspection interval proportionate to work done — which is the safest and most efficient basis for equipment inspection.

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Dubuque Electric Co.
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East Penn Electric Co.
East St. Louis & Suburban Ry. Co.
Eastern Texas Electric Co.
El Paso Electric Ry. Co.
Galveston Electric Co.
Holyoke Street Railway Co.
Houston Electric Co.
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Indiana Service Corp.
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Ohio Valley Electric Ry. Co.
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ECONOMY METERS

th Pantasote and Agasote

Electric Railway Journal
October 31, 1925

Covering the country **Pantasote and Agasote**

In the Far West

Fresno

The very spirit of the communities served by Far Western electric railways has practically compelled the adoption of progressive operating policies. Standards of service and car appearance have had to be kept high. Costs have had to be watched closely to maintain an economic balance. That has meant careful buying of maintenance materials and well planned specifications on new jobs.

It is the reason why Fresno, the "Rain Town," together with Los Angeles, Fresno and practically every other Far Western city, has consistently and uniformly specified Pantasote and Agasote for use on its electric railway cars. The Fresno Traction Company has found its own experience proved the sound cost economy of Pantasote Products. In doing this it has added to the accumulated proof of more than a quarter century's use of these products by street and electric railroads throughout the country.

Remember that Pantasote seats and curtains never look shabby—never stretch, crack or blanch under any conditions, that Agasote seats, headlinings, and interior trim cannot possibly crack or warp and will not discolor under sunlight.

Specify and limit upon previous Pantasote Products—it pays well in the long run.

Warning!
There is no substitute for Pantasote

Specify them to your home also!

PANTASOTE COMPANY, Inc.
NEW YORK
Pantasote Products for Both ELECTRIC RAILWAYS AND BUSES

Electric Railway Journal
November 14, 1925

Covering the country **Pantasote and Agasote**

The Sunny South

New Orleans

New Orleans the "Crescent City," so called from its curious situation on a peninsula land on the banks of the Mississippi river, has developed its old boundaries. And New Orleans has developed its old boundaries. And New Orleans has developed its old boundaries. And New Orleans has developed its old boundaries.

Its street car system, operated by the New Orleans Public Rating and Car Company, has had no less than 120 miles of track, on the first place devoted the specifications of Pantasote Products. It has made them a common operation for better looking material than the hardest service has demonstrated the material that will not stretch, crack or peel, and it Agasote as a practically undrinkable seat material, headlining and interior trim. You can do no better than follow the procedure set by leading railroads throughout the country. Specify and limit upon getting only genuine Pantasote Products.

Warning!
There is no substitute for Pantasote

Specify them to your home also!

PANTASOTE COMPANY, Inc.
NEW YORK
Pantasote Products for Both ELECTRIC RAILWAYS AND BUSES

South, East and West wherever electric cars are operated you'll find Pantasote and Agasote!

During the past ten months of advertising we have visited cities in nearly every state in the Union.

We have shown how Pantasote and Agasote have served the electric railways of these cities, in many cases for twenty-five years and more. Every phase of operation has been covered—street railway, interurban and electrified steam road. Every condition of traffic and climate has been represented.

North, South, East and West, the exceptional wearing qualities—the sound, last cost economy of Pantasote and Agasote have been, and are being amply demonstrated.

In the succeeding advertisements of this series we will give more complete listings of prominent cities where Pantasote and Agasote have been consistently specified by the electric railway operators. We invite you to make close investigation of our statements and claims.

And when you decide to place your order, either for installation on new cars or for rehabilitation, remember this—genuine Pantasote and Agasote, distinctive in fabrication and character, are the trade-marked products of this one company. It will pay you to be specific and to insist on getting just what you specify.

The PANTASOTE COMPANY, Inc.
At 46th, 250 Park Avenue Street
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Pantasote Products for Both ELECTRIC RAILWAYS AND BUSES

TRADE

ROL-MAN

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Chafing Plate



Chafing Plate



Pedestal Liner



Journal Box Liner

Equipped with Rol-Man Parts

A well-known, heavy-traction railroad operating on an unusually rigid track construction with many short radius curves, found that hard wear resulted on all moving parts of the car trucks—and especially on the pedestal jaws.

To overcome this situation Rol-Man Manganese Steel Wear Plates were adopted about a year and a half ago. These plates have proved so satisfactory that all cars now coming in for general overhauling are being completely equipped with them—a result that speaks for itself.

But this is no exceptional case as Rol-Man Truck and Wearing Parts are proving equally satisfactory on other roads throughout the country.

Further information on request.

Rol-Man Rolled or Forged Manganese Steel —Electric and Steam Railway Truck and Wearing Parts

Journal Box and Pedestal Jaw Gibs or Liners
Bolster and Transom Chafing Plates
Bolster Hanger Wear Plates
Side Frame Wear Plates
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Brake Beam Wear Plates and End Supports
Buffer Wearing Plates—Sector Bar Liners
Draw Bar Parts for car bodies
Forged Swing Hanger Axles and Supports
Pins and Bushings for Brake equipment
Automatic door equipment, Threaded Bolts, etc.

“Reduce wear and save repairs”

MANGANESE STEEL FORGE CO., Richmond St. and Erie Ave., Philadelphia, Pa., U. S. A.

Manufacturers of “ROL-MAN” ROLLED and FORGED MANGANESE STEEL PRODUCTS

Looking ahead



THROUGH the darkness that, in many minds, has enshrouded the future of the great electric railway industry, there comes a light. Old doubts are being dispelled, and new opportunities for service, with profit, stand out in bold relief. This light comes from the established success of the modern car.

With the advent of another New Year, it is an opportune time to consider the possibilities of modern cars on every road.

(Photograph taken by illumination from standard General Electric headlight)

11-76



GENERAL ELECTRIC

ELECTRICITY, SCHENECTADY, N. Y., SALES OFFICES IN ALL PRINCIPAL CITIES

The future



A good example of the popular one-man, two-man double-truck car. This is one of 175 light-weight cars in Providence, R. I., with four GE-265A, 35 h.p. Motors.



Rapid-transit car built for modern service from Miami to Coral Gables, Silver Bluff and Coconut Grove, Florida. Equipped by General Electric.



Having equipped the rolling stock on many of the modernized roads, the General Electric organization has become a clearing house for ideas, information, and data on the subject. G-E engineers are prepared to render a special service to companies planning the replacement of out-of-date cars.



Detroit's articulated unit is perhaps the most unique city car on wheels equipped with four GE-275 Motors, K-35 Control and CP-127 Compressors.

GENERAL

Offers attractive opportunities



rs, K-35 Control and CP-25
are on this noteworthy
of the Grand Rapids Rail-
represents a 50 per cent re-
light as compared with the
her equipment.



The past has pointed the way. "Modernization" has proved itself a worthy objective. The modern car is bringing prosperity to those electric railways which have adopted it. The industry is moving on to modernized methods and modernized equipment.

To scrap the obsolete cars still in service will require courage. To replace them with other cars better adapted to the transportation conditions of 1926 will demand the intelligent application of all that can be learned from the experience of others in modernization.

"Riding habit" has proved to be an elastic factor, with potentialities yet unknown. There are untold sources of revenue for the railway managements endowed with the vision and the ability to grasp opportunities.

The American riding public wants comfort. It wants goods put up in attractive packages—and pays well for catering to its tastes. But more than anything else, it wants *speed* in transportation and willingly pays the price to those who provide it.

In this phase of modernization, General Electric can render you a conspicuous service in furnishing light-weight motors, control and air brakes adapted to accelerate cars as fast as the other street traffic and to operate with lower current consumption.

Some notable examples of modern cars—G-E equipped—are shown here. Their success in attracting added passenger traffic, and in reducing expenses, points the way to increased earnings.

ELECTRIC



California Blue and Gold Car —a typical example of modernization



G-E car equipment has been chosen for many of the forward-looking car developments of the past year. It has been helping to establish better operating records since the beginning of the modernization movement. It is obtainable in any capacity to suit your requirements.

That the Market Street Railway, San Francisco, believes in modern rolling stock as a means of increasing patronage is indicated by the attractive color scheme used for its newest cars.

Nor has the importance of fast schedules been overlooked. On this road, steep grades are common, but these cars maintain high schedule speeds, using four sturdy and dependable GE-247 Motors.

In selecting the GE-247, the engineers of the Market Street Railway had in mind the successful operation of this motor in their service for the past five years.

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN ALL PRINCIPAL CITIES

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

MORRIS BUCK, Managing Editor

Volume 67

New York, Saturday, January 2, 1926

Number 1

A Year of Steady Progress

JUDGED in a material way, the electric railway industry has had a good year. Preliminary figures indicate that the reduction in riding during the early months was nearly if not quite made up in the summer and fall, so that the total passengers for the year will be little if any less than in 1924. With fares several points higher it is probable that the gross revenues will equal if not exceed those of the banner year of 1923. Operating expenses have changed relatively little, and with economies being practiced the net income for the industry should show a gain.

Faith in the industry is shown by the extensions of track, totaling 340 miles. This is greater than in any previous year since the war. New electrifications were 236 miles, also a record for post-war years. Track reconstruction lagged somewhat, but the total built and rebuilt and electrified was 1,156 miles, which is almost exactly the same as last year's record, which was the greatest since 1915.

SUFFICIENT attention was not paid to replacement of obsolete and worn-out rolling stock. Only 1,659 cars and locomotives were purchased or built during the year as against 4,092 the year before.

The financial situation has been very encouraging. Less difficulty was experienced in refinancing properties that could be regarded as sound investments. The lower requirements due to a smaller volume of maturities in 1926, will make financing materially easier this year. The receivership situation, which was at its worst immediately following the war, is rapidly clearing away. Although thirteen railways went into receivership last year, eighteen were returned to their owners. Two of the largest companies remaining in receivership are practically reorganized, so that

they can be expected to resume corporate management early this year.

Most encouraging is the attitude of the railway systems toward the bus. The place of the two modes of transportation is being defined more exactly. Better still, electric railway managements in large number are awake to the necessity of using the bus to round out their systems. New buses to the extent of 2,171 were bought last year by electric railways—well over twice as many as in any previous year, and the companies having bus operation increased 80 per cent. Altogether, 280 companies are now running 5,358 buses.

DURING the year just closed more constructive work has been done with a view to placing the electric railway industry on a sound footing than for many a day past. Leaders of the industry, realizing the need for forward-looking action, have been planning wisely to get a better viewpoint than has existed in the minds of the operators and the public.

Of great significance is the forward move made by the American Electric Railway Association in the formation of the Advisory Council and the appointment of Lucius S. Storrs as managing director. Much work is ahead of him. Alone he cannot accomplish a great deal. He deserves the co-operation and assistance of every electric railway owner, every operator, and every manufacturer serving the industry.

FOR the coming year there is a great deal to be done. Indications are that it will be a good year in regard to revenues and expenditures. This should make it possible to carry forward the plans that have been made for revitalizing the industry so that it may render the greatest of service to the public.

Stabilized Conditions Should Make for Progress

STABILITY of electric railway operating costs continued throughout last year. Even more than in 1924 the index figures for the industry remained fixed. This is brought out by Professor Richey's article in this week's issue, in which he reviews trends of costs and fares over the past thirteen years. The wholesale price index fluctuated between the limits of 161 and 155.2, or only 3.6 per cent, as compared with 7.9 per cent in 1924. Electric railway construction costs fluctuated still less, or between 205.3 and 200.0, or only 2.6 per cent. Electric railway operating materials costs varied between 150.3 and 158.4, or 5.4 per cent. Wages while high, showed almost no change during the year, going from 221 to 223, or only 0.9 per cent. On the revenue side of the ledger fares were likewise almost stationary, going from 149.6 in January to 151 in October, or 0.9 per cent. However, they receded a trifle to 150.7 in December.

Last year this paper commented on the remarkable stabilization in the index figures as compared with previous years. The fluctuations of 1924 now appear almost violent as compared with those of the year just closed. Last year it was predicted that stabilized conditions would be continued. It was pointed out that the constructive and conservative policy being pursued by the Coolidge administration would make for business stability and hence for similar conditions in the electric railway industry. That prophecy has been fulfilled. With the experience of the past two years there seems to be no reason why it should not be repeated—that present conditions will prevail throughout the present régime.

Conditions such as this should make for progress. Live managements have it in their power to plan with confidence. There is no reason to defer improvements for fear of losing by failure to wait for a more propitious time. What should be done is to adjust operations to the present-day status, and to go ahead without fear for the future.

Record Breaking Bus Developments Mark Progress Toward Co-ordination

EXPANSION of bus service rendered by electric railways broke all records in 1925. While nearly everyone realizes from casual observation that this development has been fast and furious, its true significance is not so readily discernible. Figures show that between Jan. 1, 1924, and Jan. 1, 1925, the number of railway companies operating buses increased about 30 per cent and the number of vehicles slightly more than doubled. During the year just ended the number of railway companies operating buses increased approximately 80 per cent and the number of buses went up almost 120 per cent. New buses ordered in 1925 numbered more than 2,100 as compared with a total gain of some 2,800 in the number owned. Over 3,000 miles of new bus routes were established by the railways, while less than 300 miles of track was abandoned in favor of bus operation.

Careful consideration of the figures presented in the article on bus development published elsewhere in this issue leads to several important conclusions.

1. The increase in the number of vehicles being more rapid than the increase in the number of companies

indicates that the experience of the railways operating buses has been satisfactory and that they are extending this type of service.

2. The large number of buses ordered during the year by the railways shows that they are making an energetic effort to provide high class modern transportation facilities.

3. The difference of more than 700 between the net gain for the year in the number of buses owned by electric railways and the number bought from the manufacturers shows that the companies have bought out many competing independents with a view to co-ordinating rail and bus services. Just how many buses were bought in this way is difficult to determine, but the number is considerably more than 700 because the number of buses junked during the year must be added to the figure mentioned above.

4. The mileage of extensions to bus routes operated by electric railways being more than ten times as great as the railway mileage on which the bus has replaced the car indicates that the existing transportation systems are spreading out to provide service to additional territory.

Encouragement for both the bus and the electric railway is to be found in this situation. Not as competitors but as partners in a joint transportation enterprise they are forging ahead. Co-ordinated service, long believed to be the solution of the transportation problem, made real progress during the past year.

The Public Judges a Railway by the Appearance of Its Cars

CONDITIONS which demand the earnest attention of the entire industry are evident as the result of a survey of the age of electric railway passenger cars. This nation-wide survey, made by ELECTRIC RAILWAY JOURNAL as a feature of this issue, is published on another page. Although mere age alone is of little significance, when viewed in the light of progress that has been made in design and construction over a given period, it becomes a definite index to the condition of the physical equipment. The past fifteen years have brought many fundamental improvements in cars. Previous estimates indicating 25,000 obsolete cars that are in condition to demand rapid replacement are now shown to have been very conservative.

Of much greater importance than seems to be generally accepted are the factors arising from the condition of the cars on a given property. It has been demonstrated on many roads that modern, attractive equipment has a direct effect on the volume of riding. That it helps to maintain regular schedules and to reduce delays and pull-ins is obvious. But it is not so generally recognized that such cars have a direct effect not only on the public's opinion of the railway but also on the morale of platform employees and on their general attitude toward their work. There has also been too little attention given to the reduction in accident hazard made possible by modern cars.

Many examples indicate that the increased earnings and reduced expenses that result from the operation of modern cars of proper design provide an attractive investment basis for financing. Car builders are ready and willing to finance new cars on attractive terms that literally permit them to pay for themselves. One large

car builder considers equipment trust paper so attractive that he carries it himself as a desirable investment. According to this same builder, no electric railway has ever defaulted on an equipment trust.

In the light of these conditions it is apparent that the industry has been backward in modernizing its equipment. To be sure, it has passed through a most severe period of operating handicaps and restricted credit. But many properties have spent relatively large sums for rebuilding and rehabilitating old, awkward-looking and heavy cars. There has been a tendency to act on the basis that a street car should last forever. Too little attention has been given to the effect of obsolescence on the general standing of the railway in its community. The public has been educated to look for improved design and appearance in transportation vehicles, and in many cities the nondescript and venerable cars suffer by comparison with the modern automobiles. Their appearance has been taken as symbolic of the general condition of the industry.

Much of the popular apathy toward measures for the relief and improvement of electric railway transportation is attributable, in part at least, to the impression of general obsolescence made by the appearance of many cars. The sooner these are replaced and removed from service the quicker will the industry move forward toward that era of renewed prosperity and usefulness which most leaders of thought foresee for the immediate future.

Tendencies in Car Design as Reflected by Statistics

ONE-MAN, two-man cars were bought in greatest quantities during 1925. This evidence of the continued popularity of this type of car is an outstanding feature of the statistics of new rolling stock purchases for last year. For city service one-man, two-man cars constituted 45 per cent of the total of new cars bought, and 14.4 per cent of the interurban cars were of this type. Cars arranged solely for one-man operation amounted to but 11.6 per cent of the total number bought for city service. The number of two-man cars was nearly double that of the one-man type but less than half the one-man, two-man cars.

These figures summarize the relative buying during 1925 of the three types of passenger cars used in surface transportation. The flexibility of the one-man, two-man type which can be operated by one man during off-peak periods and by two men in most congested service meets a long-felt want.

In regard to the size of surface cars, most of the demand was for a car about 44 ft. long and seating 48 passengers. In collecting data for this issue no attempt was made to assemble information as to structural details, but from descriptions of cars published during the year it appears that end entrance and exit cars have been purchased almost entirely. Arch roofs and "T" posts are universally used. Platforms are level with the car floor or with slight ramps and a single step between the roadway and platforms is used. With this type of construction 26 in. diameter wheels became the universal favorite in order to keep step heights to about 16 in.

In general, there have been no radical departures in car design during the last year from that put forward in 1924. Much attention, however, has been given to increasing attractiveness and providing greater comfort.

Large Mileage of Track Extensions

Augurs Well for Future of Electric Railways

OPTIMISM for the future of the electric railways is the outstanding impression created by examination of the figures for track extensions made in 1925. New track built during the past year totals nearly 340 miles, more than in any other year since 1917. It would be difficult, indeed, to find more convincing evidence of the important place which the electric railway occupies in the general transportation scheme.

City track extensions were larger than for many years past, as were also the interurban track extensions. This was no sudden spurt to make up for delayed development, as each of the past four years has shown greater track extensions than the preceding twelve-month period. Expenditures for track construction in 1925, however, were not so large as they have been in some other years. This may be explained by the fact that many extensions have been in suburban territory, where the cost of construction is moderate, and also by the fact that part of the paving expense is now being borne by the municipalities.

That the figures for recent years are smaller than those of a decade ago should cause no uneasiness. In those earlier days the electric railway industry was still in a state of development. Today the need for rapid expansion is past, and a steady, healthy growth has taken its place. In fact, we now realize that not all of the expansion of earlier years was necessary or economically justifiable.

But that lesson has been learned. Extensions are not being made nowadays to compete with existing lines, nor to aid in the promotion of real estate ventures. They are made to fill real transportation needs, and only where the volume of traffic promises to justify the expense. Forced by the pressure of post-war high prices to scrutinize every expenditure with the greatest care, the electric railways have never cast off the habit. Yet they deem it worth while to continue building hundreds of miles of new track every year.

Let the pessimists weep at their own prophesies of impending doom for the electric railways. Unwavering confidence in the future on the part of the managements and investors is indicated by their readiness thus to increase the physical plant year after year.

Manufacturers Have Contributed Much to Progress of the Industry in 1925

WELL-GROUNDED satisfaction may be gained from the degree of stability which has marked electric railway equipment prices during the past year. While the general upward trend of economic prosperity has not affected this field directly, due perhaps to the policy of watchful waiting adopted by the operating companies in the matter of additions to equipment, nevertheless the industrial situation, viewed from the standpoint of the manufacturers, is not too somber in aspect.

Practically every business forecast assures a continuation of excellent industrial conditions in general for at least the first half of 1926. Prices are expected to remain fairly stable and there seems little reason to presume any variation from this rule on the part of railway supplies. In fact, it would seem, from the predictions for the current year made elsewhere in this issue by representative manufacturers, that a spirit of

confidence is shared generally in the ability of the industry to hold its own and slightly improve its purchases.

In the important matter of research and development work on new equipment the manufacturers have been far from idle during 1925. Regardless of the rather sluggish buying which characterized the past twelve months, the producers of railway supplies realized the necessity of further aiding the operating companies through improvements in rolling stock and equipment which would cut down operating costs and attract additional passengers. Hence the large sums annually expended in this direction suffered no material reductions.

It is interesting, in this connection, to note the particular forward strides which representative manufacturers themselves consider as having contributed most of value to the welfare of the industry. Among these were noteworthy reductions in the weights of city and suburban cars, the development of a practically noiseless street car and improvements in the efficiencies of gas-electric buses. Of more general application to transportation problems was the further perfection of oil-electric cars and locomotives.

Electric Railway Expenditures Again on an Even Keel This Year

CONSIDER the fact that the purchasing power of the electric railway industry in the last three years has had a high of \$282,000,000 and a low of \$262,700,000, a variation of less than 8 per cent. This indicates a most even trend of a business of truly large magnitude. The forecast this year is that \$296,150,000 will be spent on new plant and materials for maintenance of existing plant, exclusive of labor. This is nearly 10 per cent greater than the average of the last three years.

Essentially, half of the enormous total will be spent for new construction that will require some form of financing. In recent years this has been a matter of difficulty that has been overcome to some extent through the issue of customer and employee ownership securities or through the aid of car trusts or temporary loans.

The remainder of the budget is that portion of the operating moneys required for the purchase of materials, repair parts and supplies used in the regular maintenance of the cars, tracks, buildings and other structures of the operating companies.

The electric railway industry is indeed one of tremendous proportions. Besides the operating forces necessary to utilize the invested capital and put to work the new money planned for the new year, there is an entire army of men immediately behind the front line ranks in the form of the manufacturers. It is the duty of this group properly to design, manufacture and market the products necessary for operation.

Each phase of these operations is an important element in the successful operation of the railways, and the work of design, manufacture and marketing of the supplies and materials is of as much importance to the purchaser as the market itself is to the manufacturer. This relationship is often lost sight of and is one that calls for the closest co-operation.

Certainly the record of these years and the promise of the new year go a long way to offset the gloom that crops up from time to time, either occasioned by a local company in financial difficulties or perhaps from certain sections of the banking fraternity that have some railway issue thrust back on their shoulders through failure to pay a return on a swollen capitalization.

Proper Balance of Financial Structure Essential

SENTIMENT among bankers toward electric railway securities is distinctly more favorable than it was two years, or even a year, ago. This is reflected in the article elsewhere in this issue. The most glowing sentiments, however, are likely to run to cover under the test of performance. It is not intended by this remark to convey the idea that there is any lack of sincerity in the opinions expressed, but merely to indicate that less fear is felt both among the bankers and the investing public about the future outlook for the electric railways and for the securities based on these properties as a lien. That might at first appear like a Pyrrhic victory, but actually it reflects the sentiment fostered by the many examples of electric railways revitalized in the last few years.

Bankers recognize fully the adverse conditions under which many managements have labored and appreciate the accomplishments in the application of engineering and managerial skill, but they agree with the committee which reported at the Atlantic City convention that the only way out for many properties is by the reorganization of the capital structure. The presentation of this report was one of the most noteworthy events of the year. To many, no doubt, the recommendations contained in it, particularly the one urging voluntary readjustment of finances, came as a shock, but it was a shock that was very much needed. The committee certainly did a business-like job. There is no need to reiterate all the points that the bankers brought out. It does seem advisable, however, to point out again the value of the car trust certificate as a vehicle for the financing of purchases of new equipment. A review of the record of the past shows the high regard in which such securities are held among the bankers, the car builders and the investing public. A great help in this connection will be the successful working out of the plans for interchangeable freight equipment now under way among properties in the Central West.

The talent is available on the operating side to carry on progressively, but an improper, antiquated and rigid financial structure is recognized by the bankers as a greater hindrance than an antiquated engineering structure or plant. In either case the management does not have tools sufficiently flexible and convenient to permit satisfactory operation. To the end that the bankers may be more fully informed about the financial problems of the electric railways the plea is made for co-operation among the members of the American Electric Railway Association in presenting data which would include a balance sheet as of Dec. 31, 1925, with a record of earnings and interest charges for the last five years as an indication of each particular trend and also an estimate of earnings and interest charges for the next five years, and a statement of the probable new capital necessary and the debt maturing within five years.

The time for response to this appeal is at hand. Banker co-operation with the electric railway industry and the constructive work that the bankers may be able to do depend very largely on the extent to which the various companies respond. It is not always true, either financially or otherwise, that he travels farthest who travels alone. The industry is bent upon developing the science of transportation. There can be no adequate development of this kind that does not take fully into account the place that proper financial balance in corporate structure plays in modern business.

Railways Plan to Spend \$296,000,000 for Plant and Material in 1926

Purchasing Power of the Industry Shows Healthy Progress—An Increase of 11.66 per Cent Over Last Year's Figures Is Promised—Large Track Construction Program Is Included in Forecast Submitted by the 57 Operating Companies Furnishing Information

PURCHASES by electric railways for the new year promise to exceed those in 1925 by 11.66 per cent. ELECTRIC RAILWAY JOURNAL'S forecast for 1926 is \$296,150,000. This is higher than the estimated actual expenditures for any of the preceding three years and is significant of the outstanding confidence in the permanence of the industry.

This is the fourth forecast of the purchasing power of the electric railway industry made by this paper. In December of each year it sends questionnaires to a number of large companies, in which they are requested to submit confidential figures showing the actual materials expenditures for way and structures, equipment, and power, divided between capital and maintenance accounts. Necessarily, the actual expenditures reported must be based on ten or eleven months of the current year, which, however, is generally quite accurate. The forecast for the coming year is based on the budget figures as actually prepared by those companies making replies to the questionnaire. There is a continual increase in the number of companies making returns. This year there was a total of 57 companies, represent-

ing most of the large companies and geographically well distributed over the United States.

An analysis of the accompanying table and charts based on the data contained in this table shows many interesting figures. Of importance is the trend of maintenance expenditures, which have steadily increased for three years and promise a further advance in 1926 equal to an increase over 1923 of nearly 50 per cent.

Expenditures for new plant and equipment in 1925 and the forecast for 1926 do not come up to 1923. The forecast for 1926, however, promises a substantial increase over 1924 and an even greater increase over 1925 of \$25,000,000. While the increased use of the bus is responsible for a large part of this promised advance, it is a significant fact that expenditures for way and structures, largely new track, promise a marked upward trend in 1926 of nearly \$20,000,000 over 1925.

Segregation of equipment expenditures into rail cars and buses is a new feature in this year's estimate. Expenditures for new buses and accessories by electric railway companies were more than \$15,000,000 in 1925, or 23.8 per cent of the total amount spent for equipment.

"ELECTRIC RAILWAY JOURNAL'S" ESTIMATE OF EXPENDITURES OF THE INDUSTRY

New Plant and Equipment

	1922	1923	1924	1925	Forecast 1926
Way and structures	\$85,000,000	\$74,000,000	\$56,000,000	\$52,400,000	\$72,000,000
Equipment	38,000,000	78,000,000	60,200,000	Rail..50,400,000 Bus..15,680,000	45,700,000 22,750,000
Power	28,000,000	28,000,000	17,000,000	5,150,000	8,320,000
Total	\$151,000,000	\$180,000,000	\$133,200,000	\$123,630,000	\$148,770,000

Maintenance Materials and Supplies

Way and structures	\$42,000,000	\$57,500,000	\$56,900,000	\$58,950,000
Equipment	44,000,000	54,000,000	Rail..54,700,000 Bus...7,370,000	54,000,000 11,230,000
Power	16,000,000	18,000,000	22,650,000	23,200,000
Total	\$102,000,000	\$129,500,000	\$141,620,000	\$147,380,000

Total of New Plant and Maintenance Materials

Way and structures	\$116,000,000	\$113,500,000	\$109,300,000	\$130,950,000
Equipment	122,000,000	114,200,000	Rail.105,100,000 Bus...23,050,000	99,700,000 33,980,000
Power	44,000,000	35,000,000	27,800,000	31,520,000
Grand total	\$282,000,000	\$262,700,000	\$265,250,000	\$296,150,000

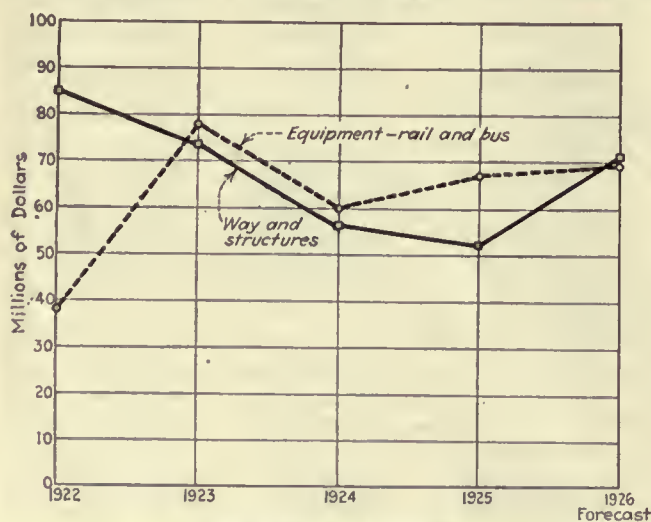
In 1926 the expenditure for buses is estimated at nearly \$23,000,000, or 33.2 per cent of the total estimated new equipment purchases in 1926. The combined expenditures for rail cars and buses have thus remained fairly constant for a period of four years, including the 1926 forecast.

Of peculiar interest is the marked upward trend of the estimate for new track expenditures in the 1926 forecast. For the first time in four years the track expenditures have forged ahead of those for equipment. One incentive for increasing line extensions, double-tracking, etc., is undoubtedly the relief of paving charges that many companies have succeeded

in obtaining. With the coming of the new year further relief is expected from this antiquated form of taxation.

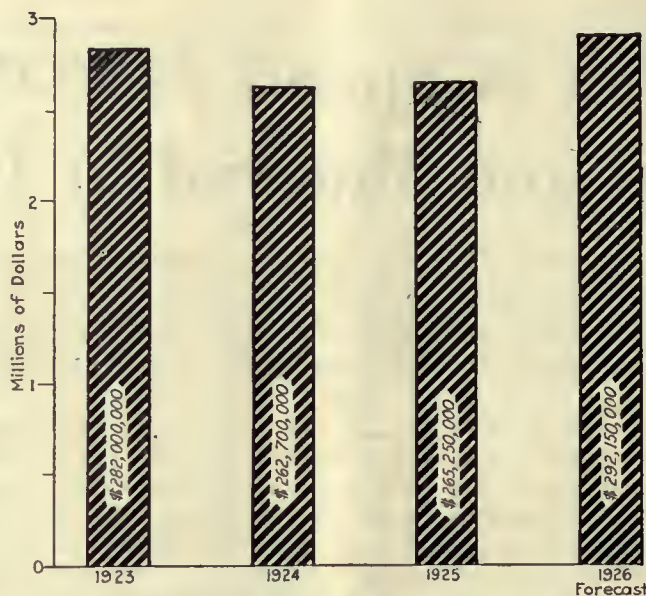
New plant expenditures in the power group show a marked falling off for 1925 and in the forecast for 1926. This is undoubtedly due to the increased use of purchased power as against power generation and denotes generally an economy in operation, although it detracts from this one angle of the purchasing power of the industry.

Without doubt there was an excess of optimism a year ago on the part of the railway companies reporting expenditures and budgets, which were used in making this annual estimate of the purchasing power of the industry. The excessive estimate for new plant and equipment was more than could be expected of a conservative growth. Early in 1925 there was a general recession in business all over the country. This naturally had its effect on the electric railway industry. In the early months of the year passenger traffic was off considerably. While improved business conditions in the summer and fall increased the riding, so



New Plant and Equipment

Analysis of purchases for new plant and equipment indicate that expenditures for way and structures will forge ahead of increased rolling stock purchases in 1926.



Total Expenditures for New Plant and Equipment and Maintenance Materials and Supplies

The purchasing power of the electric railway industry for materials and supplies, and new plant and equipment, equals nearly 30 per cent of its billion dollar annual income.

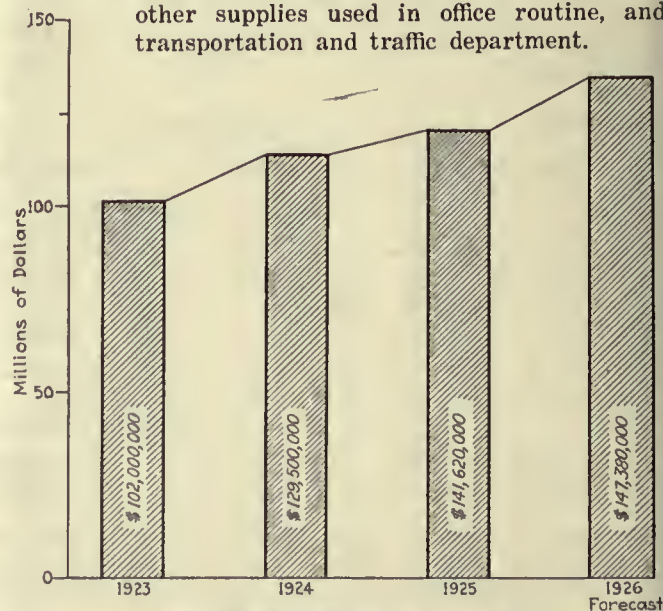
that the total revenues for the year will equal those for 1924, the period for starting major improvements had passed. Consequently many companies showed a materially reduced program for extensions and capital expenditures from that they anticipated a year ago.

The estimated purchases of maintenance materials and supplies, however, were exceeded and indicate a tendency to put the house in order and to progress with new projects in an orderly manner.

The method of making this forecast by ELECTRIC RAILWAY JOURNAL is similar to that employed in years previous. Essentially the same list of companies was requested to report

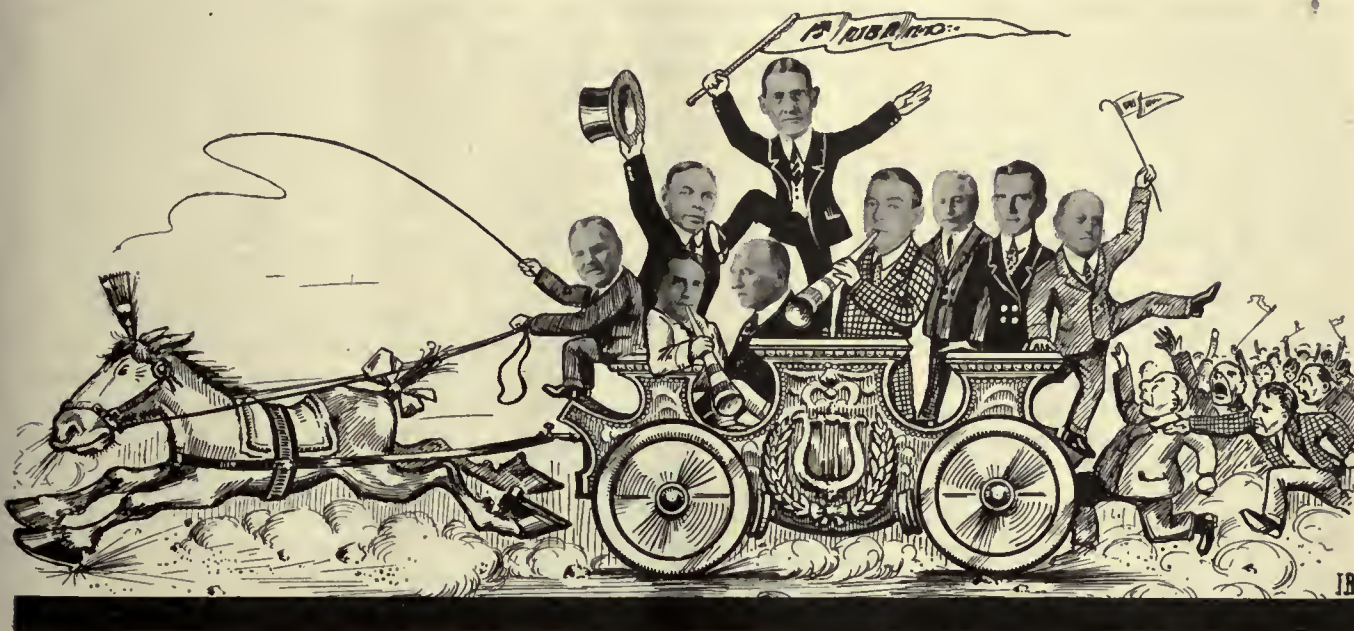
expenditures for the year 1925 and the budget for the coming year. Some companies replied that they made no budgets, others replied that they weren't ready, and others just didn't reply. A great many of the companies, however, appreciated the importance of the estimate and made careful and prompt returns. Included among these are most of the large companies in all parts of the United States. The totals for the industry are interpolated from the ratio that the track mileage and operating cars of the reporting companies bear to the total of the industry.

These estimates do not include expenditures for new subways and elevated railways that are financed by the cities in which they operate. Likewise this estimate is far less than the actual expenditures for operating the properties as the estimate of maintenance materials and supplies is only for purchases of such materials, and does not include labor or the purchases of other supplies used in office routine, and transportation and traffic department.



Maintenance Materials and Supplies

The steady increase in maintenance and rehabilitation expenditures is the greatest indication of the operators' faith in the industry.



Your Place Is on the Band Wagon Along with the Leaders

Fiction Has Nothing on These Facts!

Suppose You Went to the Door to Answer the Bell and Found a Conductor Instead of a Cop, What Would You Say?—A Science of Transportation Is Being Developed—If You Don't Believe It You Are Out of Touch with the Events of the Industry During 1925

By G. J. MacMurray

News Editor ELECTRIC RAILWAY JOURNAL

SIMEON FORD, the famous wit, said of one of his articles: "If this article, which is meant to be deliciously light and playful, appears to you to be fraught with an underlying varicose vein of gloom, do not hastily pass it by, but remember that it's in the interest of science." That sentence helps a lot. It certainly is a light and playful task to take all the outstanding events of the year in this industry and weave them together into a whole that will be as stimulating as is H. G. Wells' history of the world. But the vicissitudes of journalism are beyond divination. Science must be served. Mr. Wells can, perhaps, afford to be romantic rather than realistic, but I must be realistic in much that I write. All Secretary Welsh's men would call me to account if I treated playfully the statistics of the industry compiled by my good friend Edmund J. Murphy, who registered his *magnum opus* as an orator at the recent convention at Atlantic City.

All the adverse factors considered, there is cheer for nearly every-

body in statistics published by the American Electric Railway Association in May which gave operating results on 370 companies, mostly the larger ones. Altogether their operating revenues in 1924 were \$786,530,422, or approximately 1 per cent less than in 1923; the operating expenses in 1924 were \$581,288,567, or approximately 0.6 per cent less than in 1923, making the 1924 net operating revenue \$205,241,855, or approximately 2 per cent less than in 1923. The revenue passengers decreased 1.18 per cent. These figures are neither strident nor cacophonous. They are merely a delicate adumbration of sacred truth achieved by the association's cicerone of statistics. I have no desire to paint the lily or to gild gold. Let us pass on.

FACE TO FACE WITH THE PETRIFIED PAST

Far too often we find ourselves face to face with the petrified traditions of past periods. This is not a new situation in the electric railway industry. Heretofore this matter

has been met by doing something drastic, very drastic—like passing a resolution. This year, however, the new Advisory Council, headed by B. C. Cobb, selected Lucius S. Storrs to develop a science of transportation which would result in bringing the members of the family into what Samuel Johnson might have called a consanguine conglobulation. The industry's birthstone might be the grindstone, but it at last came to the same conclusion as the vacuum cleaner, which exclaimed one day as it was pushed over the carpet: "I'm being played for a sucker." In other words the industry was like the man who slipped on a banana peel and executed a funny face, not being hurt, as it turned out, but having his dignity somewhat ruffled. When he recovered a moment later a friend was holding his hat and a number of people had formed a circle.

"What do these idlers want?" he snarled.

"They are not idlers," explained his friend soothingly. "Here's a doctor who wants to look you over,

a lawyer ready to bring suit for you and a producer of comic films who would like to write you up."

It was something like that with the railways. There they were, all the experts—one saying his traffic arteries were congested, another that his co-ordination was bad.

What the industry needed was not more doctors, but fewer of them. If expert advice were wanted, why not get a man who was an expert? And so it turned to Mr. Storrs. Not until Mr. Storrs had been in office several months did he attempt to prescribe. Then at the meeting of the New York Association he said that the electric railway industry needed to do four things: (1) Modernize equipment, including co-ordination of electric car and bus service; (2) inform the public regarding local transportation facts; (3) obtain greater co-operation among individual utility men for the general good of public service; (4) secure remedial legislation necessary to better service by open and above-board methods.

THE POWER BEHIND THE DRONE

This diagnosis provoked a lot of comment. But the comment of our contemporaries is not always constructive. It often is merely conversation. That's what much of the comment on the Storrs speech was—just conversation. It was like the remark emitted by Pat, in the hospital for observation after an accident. The house surgeon carefully examined the patient, after which he thus stated the case to the nurse:

"As subcutaneous abrasion is not observable, I think there is little reason to apprehend tegumental cicatrization of the wound. What do you think yourself?" he asked Pat. "Sure, doctor," replied Pat, "you're a wonderful thought reader. You took the words out of my mouth."

All of which may make Mr. Storrs the power behind the drone.

And so we enter upon the period of the renaissance of the industry. It is always difficult to fix the limits of any such period. For many companies it began years back, for others it has only lately begun, for still others it remains to begin and for the few it never will begin. These last will become the men of forgotten streets. The direction in which this industry is headed is shown by the material contained in briefs submitted in the contest for the Coffin award, won this year by

the Pittsburgh Railways, and by the events of the October convention. A. W. Thompson, president of the Pittsburgh company, said that while many things have made it possible for the company to come within the requirements laid down for the contest, he believed its chief asset has been the successful partnership arrangement with the city for the operation of the trolley service.

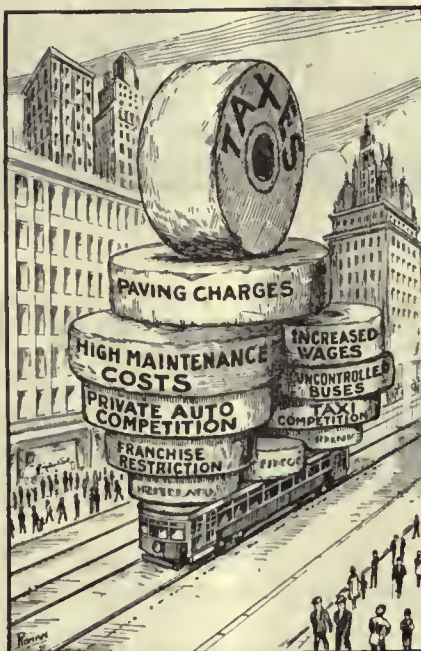
Incidentally there never was a convention of the association that reflected so well the general progressive spirit of the industry as did the

mediate predecessor, made a particularly enviable record. This is all the more to his credit as he succeeded in office a man of very great talent, a prodigious worker and a rescuer of properties for which before his advent there appeared to be little or no hope. Mr. Shannahan, unassuming, unpretentious, took up the work where Mr. Budd left off. The torch was his to hold high. And he did. Largely to him is due the credit both for the formation of the advisory council and the appointment of Mr. Storrs. As for the general work of the association, that story was told at length by John A. Dewhurst in the issue for Dec. 12, page 1029.

In speaking of the convention there is no reason why the lighter side of it should be left out of consideration, just because it was discovered too late to do anything about it that one of the speakers had been vaccinated with a phonograph needle. The girls over at the association office, the Misses Sheridan and Kelly and the sprightly Mrs. Siebrecht, are wearing at work the smocks that were distributed on Carnival Night. In doing this they have set a fashion—created a style. But we are getting away from the point, as the shavings remarked to the pencil sharpener.

DEVELOP THE SCIENCE OF TRANSPORTATION

Don't think that all the good papers and all the good things were said at Atlantic City. It was at the midyear meeting that announcement was made of the real program of the association for the year and that Mr. Storrs had been chosen managing director. You will recall that Owen D. Young said at this meeting that "you have an industry, but perhaps you haven't an art; you have a trade, but perhaps you haven't a science, and I take it, it will be the business of your managing director to develop the science of transportation in your field." There were many notable sectional meetings. At the New York gathering Mr. Storrs laid down his program for the industry. Mr. Shannahan in New England spoke on broadening the work of the association. It was only one of a number of important addresses made by him. D. W. Snyder of the Illinois Traction made a notable address on merchandising transportation last April before the Illinois Association. In June interurban consolidation and



The Industry's Birthstone Ought Not to Be the Grindstone

one last October. That isn't apple sauce, either. It led all others in accomplishments, in attendance, in exhibits and in the quality of the presentations by the committees and the various speakers. Freddie Dell, who always insists that things shall be just so, supplied the following final figures.

Year	Convention City	Total Registration at Conventions	Square Feet of Exhibit Space Sold	Number of Manufacturers' Company Members
1921	Atlantic City	1,189	No Exhibit	225
1922	Chicago	4,200	61,895	244
1923	Atlantic City	4,404	75,681	274
1924	Atlantic City	5,804	86,349	330
1925	Atlantic City	7,147	100,030	371

The new president, Frank R. Coates, has a most likable personality and is a capable and progressive operator. Jack Shannahan, his im-

car design were the topics of the C.E.R.A. summer meeting—always a great event.

Again Mr. Storrs made a cheerful and constructive address. At this meeting of the C.E.R.A. John A. Beeler advanced his suggestion for the consolidation of the interurbans in the Middle West, with the construction of connecting links. Like all of Mr. Beeler's work he made it specific and the presentation entertaining. It was a big idea, this. To a limited extent the suggestion is being achieved by the Insull interests, who have the North Shore, the South Shore and other interurban properties extending as far south as Louisville. Meanwhile don't forget the good work done in rehabilitating the Buffalo & Erie Railway and the very excellent work on the Detroit United!

IT'S A PRIVILEGE TO DEMAND GOOD TRANSPORTATION

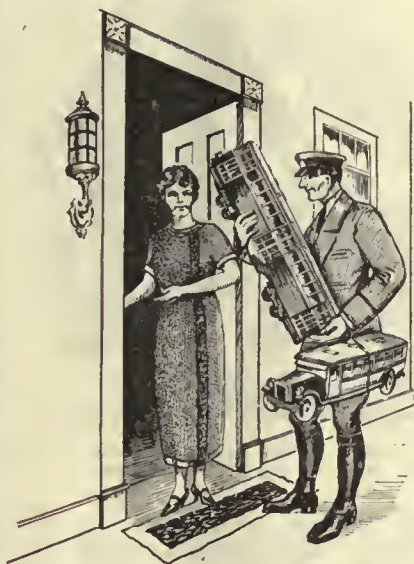
At the C.E.R.A. meeting, too, was the suggestion made by Charlie Gordon about the need for style in car design and the first intimation conveyed to the industry of the extent of the obsolete equipment which is now in service. This need for the installation of new equipment was driven home at Atlantic City and later by Mr. Shannahan in his West Virginia address. Many managers, far too many managers, are endeavoring to merchandise a product of the kind produced in 1900 or earlier. Is it any wonder that the public is reluctant to respond? And you will recall that George Kippenberger, now vice-president of the St. Louis Car Company, said that the car builder had very little choice in the matter. The manufacturer built to specifications. He sensed that in this day and age the passengers wanted something more than just to be handled safely. This is a reflection of the same sentiment to which Pete Witt gave expression at the midyear meeting to the effect that Pullman was the first man to sense the fact that the public wanted better transportation. As James H. McGraw said in "Charting a New Course" in the issue for Sept. 26, "It is a privilege of the people to demand better and better transportation, and for it theirs is the obligation to pay. Our duty is to serve in a manner worthy of our trust."

The extent to which the JOURNAL prints the proceedings shows the regard in which it holds all these

efforts to bring out significant facts presented in the papers and in the discussions before national and sectional bodies.

SIR GALAHAD OF PUBLIC SERVICE

To borrow a phrase, the electric railway man should be Sir Galahad with public service as his Holy Grail. The equipment means little if its use is not sold intensively. That is just what is being done. Not only is service being advertised, but the street car and the bus are, metaphorically speaking, being taken



Selling the Car and the Bus Just as Other
Commodities Are Sold

right into the home. The Toronto Transportation Commission asked its patrons by mail for service suggestions. So did the Key System Transit in Oakland and the Springfield Street Railway, Springfield, Mass. The Pittsburgh Railways sent a Christmas card to a selected list of its customers. In Grand Rapids, where so many progressive things have been done, L. J. DeLamarter organized a campaign in which his trainmen called personally on the ladies of the city with a message from the street car company. Imagine answering the front doorbell and finding a conductor there instead of a cop. Mr. DeLamarter wasn't content with this. He also staged his famous "Don't Worry" campaign. In an editorial early in the year the Philadelphia *Ledger* actually paraded the virtues of Mr. Mitten's motormen and conductors before the public of the City of Brotherly Love. Instance upon instance might be cited of this growing appreciation of the place of the railway in the community.

At the midyear meeting Pete Witt said he had ridden street cars in nineteen cities until he was sore but satisfied. In one of these cities Pete mistook the conductor for the fellow who greases the track. Pete's talk registered, all right, but what of the general transformation now going on? Think of the natty conductors of the Grand Rapids Railway, the Lord Chesterfields on the cars in Denver, the Beau Brummels who work for Bill Sawyer on the lines of the East St. Louis & Suburban Railway, which recently had its third annual clean-up of cars and crews! Forty-six men at East St. Louis received the maximum reward for their spic-and-span appearance; more than 100 others received a \$5 bonus.

In Oil City, Pa., cars are being named for local pioneers. The Oklahoma Railway has purchased and fully equipped a model farm near Guthrie. Francis Wilson, one of the receivers of the Kansas City Railways, has been riding on his own cars for five years to learn what the public wants. All of which helps to get the community with you, as Tom Fitzgerald of Pittsburgh said. There the management recognized the truth of Lincoln's words "With public sentiment nothing can fail, and against public sentiment nothing can succeed." Last summer both the Brooklyn City Railroad and the Des Moines City Railway permitted women to smoke on cars. Instance upon instance, each notable in itself, could be piled up here as a record.

THEY JUST WOULDN'T BE LICKED

Not only in what they are actually doing for the public are many companies setting a dazzling pace, but they are telling the world about it—they are emphasizing their own good points and bringing the good points of their city and their community to the attention of the public. Consider for a moment the little booklet, "A Texas Idea!" Five little utilities down in Texas, the kind that were hardest hit, just refused to be licked. One of them won the Coffin award a year ago, but the work of the others was equally notable. "A Texas Idea" was a classic.

It would of course be impossible to cite all the good advertising that has been done during the year. There is the noteworthy work of Labert St. Clair, effective and available to the entire industry. Guy C. Hecker made the editorial page of the New York *Evening Post* with "Now,

My Idea Is This." In addition to this there is a vast effort on the part of individual companies. An outstanding instance of this is the work of the Atlanta company. It made a great deal out of the fact that it permitted its patrons to have a voice in choosing the colors of the company's cars. It also did a whale of a job in advertising the new bus service. It just made the people of Atlanta want to ride.

SERVICE MEANS SELLING FREIGHT ON THE INTERURBANS

The most important development in the interurban freight business in the recent past has been the establishment of through rates and joint transportation arrangements, not only between connecting electric lines but also with steam railroads and boat lines. Freight service offered by the average interurban line at the present time is largely confined to the handling of merchandise or package compartments. Little has been done toward the development of straight carload business. A few companies have established a pick-up and delivery business. During 1925 the freight business will return a revenue of about \$65,000,000 to the electric railways.

The roads in the small cities are still having a great deal of trouble, but recognition seems to be growing of their essentiality. Witness the recent votes in favor of continuing the railways in Oskaloosa, Lorain, Port Arthur and Whitefish Bay as opposed to the substitution of the bus. The Gary Railway, under Insull management, has made a notable record, as has also the Attleboro Street Railway system, modernized and brought up to date as described by John A. Miller, Jr., in the issue of Aug. 29. Here, too, is the bus being co-ordinated with the railway.

Not all the riding is being done that should be done—or, perhaps, better could be induced, but the record, except in certain individual cases, is a progressive one. The latest United States census shows that in 1922 each inhabitant rode 116 times as the average. In 1890 there were only 32 revenue rides per inhabitant. The number of revenue rides is much greater in the cities. In 1922 they were 257 per capita, an increase from 109 in 1890. The per capita rides in the city of New York have increased from 218 in 1890 to 448 in 1924.

Right here don't forget the good work of the various public relations men and the heads of the State Public Utility Information Bureaus! These fellows, by and large, are doing a whale of a job. Nothing is more important than a public relations policy of the right kind. Public relations work must be done well or it had better be left alone. Altogether too many of these men oc-

fare rush-hour universal transfer service. The bus is a different vehicle. It offers a different service, and the price should be in accordance. No paper presented during the year aroused more comment than did that by Fred Buffe, general manager for the receivers of the Kansas City Railways. Reference to his remarks brings up the question of the use of the bus by the railways. JOURNAL figures elsewhere in this issue show that 280 electric railways are using 5,300 buses. In 1921, the records indicate that there were only 16 electric railways operating buses. In too many instances of the union of the railway and the bus it has been a case of miscegenation. The bride married with condescension, hoping that the bridegroom might rise to her level and never for a moment suspecting that hubby was already at her level if not above it.

In 1924 the largest single increase in the number of buses was made by the Public Service Railway, which added more than 500 to its equipment. Second in number of buses acquired during that year was the Northern Ohio Traction & Light Company, and third, the Pacific Electric Railway. Notable additions were made by all of these companies in 1925 and by the Cleveland Railway, the Kansas City Railways, the D. U. R. and at Atlanta. In Philadelphia alone 200 buses operating over seven routes have been put in service by the Philadelphia Rural Transit Company, a subsidiary of the Philadelphia Rapid Transit Company. There is little need to do more than mention Mr. Mitten's purchase of the Philadelphia taxis.

Early in the year the Supreme Court held that the regulations which state commissions could exercise over interstate buses was very limited. Previously the Interstate Commerce Commission had declined to exercise control on the ground that it was without authority. As a result, unregulated interstate buses are competing with common carriers, long under governmental control. Action to regulate these buses impends in the bill now before Congress.

The bus as a topic should not be dismissed without mention being made of the notable eleven-page article by Morris Buck and Carl W. Stocks on transit conditions in St. Louis. The authors went over the entire ground, covering competitive opera-



Too Frequently the Public Relations Policy
Is Wrapped Up Ready for Delivery

copy the rôle of attorney for the defense. Mr. Storrs says that too frequently is it the case that when the company's public relations policy is wrapped up and ready for delivery the public relations men are expected by hocus-pocus methods to have it received with enthusiasm and even with public applause.

GIVE THE STREET CAR A CHANCE

After all, the street car utilizes the surface street area more effectively for passengers carried than any other vehicle. Suggestions made by the committee on traffic congestion of the American Electric Railway Transportation & Traffic Association include abolition of automobile parking at all or specified hours at all points where it seriously interferes with the free movement of car traffic; establishment of one-way streets; establishment of boulevard stops at thoroughfares having car lines; some segregation of traffic; some regulation of pedestrian traffic; abolition of parades along or crossing streets required for heavy essential traffic; some abolition of left turns; establishment of safety zones, where electric cars stop to receive or discharge passengers.

The street cars furnish the low-

tions in that city. This was the first time that the full story had been told. It was an unbiased analysis of the present situation in St. Louis and the events that led up to it. Adoption of a standard classification of accounts for bus companies also is of interest.

LOW FARES FOR SHORT DISTANCES

While the uniform fare with free transfer remains that most generally employed in urban service, there has been a tendency on some lines toward lower fares for the very short distance rider and the very frequent rider. Conspicuous examples of the former practice are in Boston, where the local rider in the suburb pays 6 cents instead of 10 cents, the fare if he uses the rapid transit system; the Public Service Railway of New Jersey, which has 5-cent zones, generally coincident with city boundaries, and San Diego, which has an inner 5-cent zone and an outer 5-cent zone. In general, transfers are not given when only 5 cents is charged. The most conspicuous effort to give fare concessions to the frequent rider is through the unlimited ride weekly or Sunday pass.

NOTABLE FRANCHISE NEGOTIATIONS

On April 7, by popular vote, Chicago turned down the plan for a unified transportation system. The approximate cost of the entire system was to be \$720,902,000. By vote on April 7, Milwaukee rejected a proposed service-at-cost contract between the city and the Milwaukee Electric Railway & Light Company. The most important new franchise adopted during the year was that by the Cincinnati City Council, which was passed and accepted by the Cincinnati Street Railway. It went into effect Nov. 1, 1925. It is of the service-at-cost type, with a fare control fund having a low limit of \$200,000 and upper limit of \$600,000. As part of this plan the Cincinnati Traction Company passed out of existence and Mr. Schoepf, its head for 25 years, withdrew from his local activities. More than 300 employees who served under Mr. Schoepf are carrying watches as a reminder of his largess. The committee of the Massachusetts Legislature on Dec. 15 recommended an extension of the public control act of the Boston Elevated Railway for a period of 30 years. Last May the JOURNAL said: "Mr. Doherty Puts It Up to To-

ledo." In November Toledo appears to have reversed the process in the Riggs report, although it is not yet clear whose problem it is. Anyway Professor Riggs suggests a new deal there. This report was immediately passed over by the Council without comment to its committee on railroads and telegraphs, with which body it now reposes.

The large number of automobiles on the street has greatly increased the problem of accident prevention.

ization of local safety councils and safety campaigns.

As a further inducement to employees to make good safety records 31 electric railways in the United States now use bonus plans of one kind or another. Railways have much to gain from the results of the conference on street and highway safety, initiated by Secretary Hoover. One of the latest announcements made is that the Louisville Railway is prepared to offer substantial cash

Striking Portrayal by Cartoonist of Philadelphia "Record" of Willingness of Mr. Mitten to Turn All Forms of Transportation to His Own Advantage



awards for safety work and to send the most successful candidate among its employees to the convention of the American Electric Railway Association.

In New York Barron Collier conceived and carried out an elaborate safety parade with the hope of bringing home to the public the message of safety. In this parade memories were revived of the days

of the horse car and the hoop skirt in several of the floats. These days of long ago were also revived to the residents of Paducah, El Paso and Salt Lake City by parades held in these cities, but the demonstrations were not made in connection with safety work.

Chicago has been studying the feasibility of subways for thirteen years and has spent \$821,459 in surveys and reports—and not a spadeful of earth turned yet. Activities of the Detroit Rapid Transit Commission during the first few months of 1925 were directed largely toward securing from the state legislature

While accidents which occur in boarding and alighting and from causes other than in connection with automobiles have decreased, those in which automobiles are involved have in many places increased. In consequence, a number of companies have embarked in extensive safety campaigns by the education of their employees and pleas to motorists to help prevent accidents. With the employees, competitions between divisions have been arranged that are intended to promote the best safety results. The co-operation of the public has been solicited in many ways, as through encouragement in the organ-

authority to permit the city to proceed with the rapid transit system such as the city may elect. Los Angeles opened a short rapid transit line on Dec. 1. Much talk is heard about subway digging in smaller cities, but usually the economic obstacles to creating a self-supporting system in such cases appear to be nearly insurmountable. Perhaps the two most notable traffic surveys of the year were those by Mr. Beeler in Atlanta and by McClellan & Junkersfeld in Washington.

Manufacturer co-operation has always been given willingly in the electric railway industry. This is especially true at the present time. One of the notable contributions during the year was the study made by Victor Angerer, vice-president of William Wharton, Jr., & Company. On his own account Mr. Angerer made a survey of the industry, the result of which he later permitted to be made available to the industry through a comprehensive article published in the JOURNAL for April 4, page 533. There was the usual Wickwire contribution at the Atlantic City convention. Also on that occasion Charlie Peirce came out of hiding as a speechmaker and made impromptu at a Transportation & Traffic Association session one of the best talks of the whole meeting.

Mr. Peirce knows a lot about the business. He ought to. He has been in the selling end for 35 years. He didn't come to pose as an expert—a plain ordinary man away from home. Not only did he agree with Mr. Queeney about taxicabs in Philadelphia, but he would even supply the public roller skates if they wanted them. His idea was to get the gross up and then take care of it. He had no sympathy with cheeseparing. A salesman all his life, Mr. Peirce defied any man to continue selling anything, transportation not excluded, that was not made attractive.

SOME SIGNIFICANT LEAVE-TAKINGS

In the political arena there were a number of significant leave-takings. New York took leave of Mayor Hylan. He was eliminated in the primaries following the condemnatory report presented by Governor Smith's special commissioner who placed the seven-year delay in subway work at the Mayor's door. In this report the New York Transit Commission was exonerated. James F. Jackson, chairman of the board of trustees of the Boston Elevated Railway, resigned, due, as the

Transcript put it, to "the summary treatment of the trustees by the Governor in his statement threatening them with discharge if they 'permitted' a strike of the car men." In the stand that he took Governor Fuller virtually reversed the policy of the trustees. Later the Governor reversed his stand.

Out in Detroit Mayor Smith paid his political respects to Ross Schram, manager of the Detroit Municipal Railway, by instructing the local Street Railway Commission to dismiss Mr. Schram and to remove I. N. Merritt as auditor. Mr. Wilcox re-



Belated Justice in New Haven Case—Much Too Often Scales Are on the Eyes of Justice Instead of in Her Hands

signed about the same time as claims attorney for the railway.

Speaking of the municipal systems the city of San Francisco rejected at the recent election the purchase proposal under which the Market Street Railway would have been taken over. Incidentally, the San Francisco Municipal Railway was operated at a loss of \$295,230 for the year ended June 30, 1924, the latest official figure available. The excess of income over operating expenses and reserves actually was \$8,374, but this figure took no account of taxes and similar items amounting to \$303,604. This is a commentary on the inadequacy of the 5-cent fare. On the other hand, Seattle piled up a profit of \$557,243 for the year 1924 compared with \$169,636 in 1923. This was done under the 10-cent cash fare with three tokens for 25 cents, a rate reached after experimenting.

The politicians, led by Mayor

Schwab of Buffalo, have certainly kept Mitten Management from attaining the rehabilitation of that property. Little attention was paid locally to warnings about the inadvisability of allowing a 5-cent bus company to compete with the International until a disinterested committee reported adversely on the proposition. The politicians of St. Paul and Minneapolis have finally seen the light and have entered into an arrangement with the railway for a settlement that could have been effected just as easily at the inception of the controversy had the men elected locally to public office assumed a different attitude. Because public authorities kept their eyes on political expediency and not on economic needs a decree was entered in 1914 requiring the New Haven Railroad to sell its New England trolleys. These now go back to that property under the decree of Judge Winslow rendered on Nov. 21. Meanwhile, however, the Rhode Island lines passed into the hands of a receiver and so are lost to the New Haven at a cost of many millions of dollars and no benefit to the public. In Pennsylvania the Supreme Court overruled the removal of Public Service Commissioners Benn and Shelby, summarily dismissed by Governor Pinchot last August during the progress of the Philadelphia Rapid Transit fare hearing. Much too often, however, scales are on the eyes of Justice instead of in her hands.

During the year the courts and commissions upheld the use of one-man cars in Buffalo, Milwaukee, Dayton, Worcester, New Haven and Nashville. Public Service Railway of New Jersey is now operating practically 100 per cent with one-man cars.

And so this desultory account has run on to the extent of six pages. But Montaigne very aptly said that "the world is nothing but babbling and words," after which he himself went babbling. Remember that the great Burke, frightened by the thunders of change all about him, turned back to the past, while Thomas Paine, thrilled by the same thunders, saw a dawn and proclaimed a hopeful future. The harder the conflict the more glorious the triumph. A better outlook depends in a large measure on a better lookout. When it puts away discouraging prophets this business will put away encouraging profits.

Issues of Merit Easy to Sell

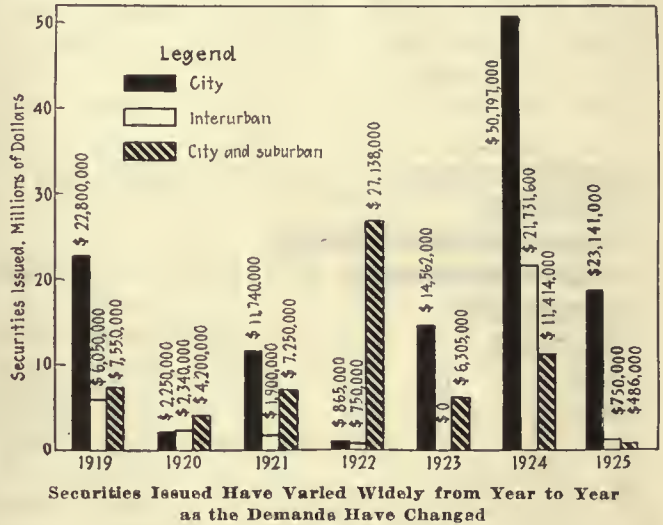
Total of Financing in 1925 Not Large Compared with Recent Years, but Companies with Good Operating Records Experienced No Difficulty in Finding a Market for Their Issues at Reasonable Rates—Need Is Imperative for Recasting Many Financial Structures

HOUSES of issue which in recent years have sold electric railway bonds to the public report that issues of real merit are much easier to sell to the public than were similar issues two years ago. Unfavorable sentiment which existed for a long time is no longer as evident as it was. This is attributed to the general improvement in the railway situation, but more particularly to the eradication from the mind of the public that the bus is destined to replace the railway. This change in sentiment is due to the publicity that has attended the willingness of the railways to turn the bus to their own advantage.

In this connection investment bankers point out that the situation in the electric railway industry as regards competition and changes in the fundamental aspects of the business have not been very different from similar conditions with which industrials have had to contend. There is, however, this notable exception, namely, that the industrials are not subject to the service restrictions which have been placed on the railways with respect to the conditions under which the two function. The railway that has found a solution of the bus problem is, of course, in a much better position to do its financing on better terms than is the company which has not solved that problem. In fact, new financing is approached by the banker on the basis of such solution having been found.

Over and over again bankers referred to the report of the advisory committee on electric railway finance, presented at the convention of the American Electric Railway Association, as stating concretely their attitude toward the whole problem. As they see it, the problem is one in which a proper balance must be struck among the engineering, operating and financial sides of the business. It is notorious that most electric railways are badly financed as regards the proportion of the bonded debt to the fair value of the property. The feeling of the bankers is that until the recent report was presented at Atlantic City nobody had suggested any remedy for the railways except more business. More business is highly desirable, but it is realized by the bankers that

no amount of merchandising or skill in operation will correct a financial situation that is inherently unsound. The thing to do is to clean house. This seems at first severe, but is it? Eventually the situation becomes untenable. It becomes untenable because the cost of new money exceeds the return on it that can be earned. Money costs vary with the hazard that is involved. Thus to a company that is earning its in-



terest twice the cost would be 6 per cent. With a lower earning ratio the cost goes up on a constantly increasing scale to the point where it would be 10 per cent if interest were earned only 1.20 to 1.35 times. In other words, as the bankers point out and as the committee has emphasized, where a company is earning only a small margin over fixed charges, three important factors militate against it:

1. Where money can be raised at all for necessary capital expenditures, it can usually be done only at a cost greater than the return the money is likely to earn.
2. Where the operation is a refunding one, the new obligations, not even considering the general state of

Details of New Bond and Note Financing in Amounts of More than \$200,000 Offered Publicly During 1925

Issue	JANUARY	Price	Maturity	Yield	Amount
Brooklyn City Railroad-Equipment Trust Certificates.....			1926-35	4.50-5.50	\$3,750,000
Chicago, Aurora & Elgin Railroad 2-year 6½ notes.....		100 and interest	1927	6½	750,000
Reading Transit Company first and refunding gold Series A 6'a.....		98 and interest	1954	6.15	1,250,000
	FEBRUARY				
Eastern Mass. St. Railway Refunding Mortgage Series A 4½.....				7.0	(block)
Worcester Consolidated Street Ry. 1st and refunding gold 4½'s.....				....	2,116,000
	MARCH				
Philadelphia Rapid Transit gold 6'a.....		99 and interest	1962	6.06	8,975,000
	JUNE				
Norfolk & Portsmouth Traction First Mortgage 5's.....		98½ and interest	....	....	486,000
	AUGUST				
Gary Railways First Refunding 6½'s.....		96 and interest	1945	6.75	550,000
	OCTOBER				
Cincinnati Street Railway 1st 6'a.....		100 and interest	1928	6.00	4,500,000
	DECEMBER				
Chicago Rapid Transit Company first and refunding mortgage 6½'a.....		95 and interest	1944	6.98	2,000,000
Total.....					\$24,877,000

the money market, will bear a higher rate than did the one maturing.

3. Companies in either of these positions, even if they are able to borrow on a mortgage, will not be able to raise any new capital by the sale of stock.

There is no blinking the facts. There has been considerable financing of electric railways during the last five years on terms that were very favorable to the borrowers, but these instances were by companies strategically situated with favorable records of earnings in the past and under management known the country over for its progressive attitude. For the others the only way out, except at terms in themselves prohibitive, is by revamping the capital structure. The bankers have said quite definitely that an improper, antiquated and rigid financial structure is usually a greater hindrance than an antiquated engineering structure or plant. In either case the management does not have at hand tools sufficiently flexible and convenient to permit satisfactory operation.

It has been said before that a situation similar to that in the electric railway field has existed in other industries. It has. Witness the high rates paid only a few years ago by industrials with good credit ratings for the new money they needed. Be-

cause of their strategic earning position, however, many of these companies have refunded the issues so put out, paid some of them in part or paid them in full. The very nature of the utility business does not permit a surplus to accrue that makes it possible to retire issues either in part or in full out of earnings. There is all the more need for some managements resolutely to face the facts and to put their financial houses in order. Voluntary readjustment is never easy to accomplish. The recent case of the Detroit United Railway is an instance in point. That road appears to be working out its own salvation under receivership, but the stockholders with the prospects before them of an assessment of more than \$30 a share to protect an equity appraised market-wise at \$4 a share did not consent to the levy in numbers sufficient to keep the property in their own hands.

So far as the maturities for the new year go, they total \$26,644,790 compared with \$28,224,000 in 1925. Incidentally this table of maturities indicates the rates at which financing was done 25 or 30 years ago under favorable economic conditions, with paving and franchise terms not then onerous and with wages averaging about 21 cents an hour compared with about 65 cents now. The contrast is a striking one. As for the amount of bonds now in default the total of about \$200,000,000 appears to be imposing, but it is not so when the conditions of the last few years are considered and the figure is weighed in the light of the total of \$6,000,000,000 invested in the industry. Even allowing for the roads that have come out of receivership recently the list shows strikingly the type of road hit hardest.

In one respect banking opinion appears to be divided. That is on the equipment trust. It is agreed that so far as freight equipment is concerned the ability of the companies to borrow against such equipment would be helped materially by standardization of design such as

Seven-Year Record of New Electric Railway Financing Involving Bond or Note Issues of More than \$500,000

	City Railway	Interurban	City and Suburban
1919.....	\$22,800,000	\$6,050,000	\$7,550,000
1920.....	2,250,000	2,340,000	4,200,000
1921.....	11,740,000	1,900,000	7,250,000
1922.....	865,000	750,000	27,138,000
1923.....	14,562,000		6,305,000
1924.....	50,797,000	21,731,600	11,414,000
1925.....	23,141,000	750,000	486,000

Comparison of Maturities in the Electric Railway Field

1926.....	\$26,644,790	1922.....	\$160,015,860
1925.....	28,224,000	1921.....	207,617,530
1924.....	73,051,600	1920.....	80,466,100
1923.....	94,851,800	1919.....	116,785,500

Principal Electric Railway Maturities in 1926 Based on Dow, Jones & Company's Compilation

	Rate	Amount
January		
Niagara Falls & Suspension Bridge Railway, 1st.....	6	\$488,000
Interborough Rapid Transit Company, equipment trusts, B....	6½	450,000
Eastern Massachusetts Street Railway serial.....	6	300,000
Lowell & Fitchburg Street Railway 1st.....	5	275,000
Oklahoma Railway junior mortgage.....	6	260,000
Brooklyn City Railroad equipment trusts A.....	5	375,000
		\$2,148,000
February		
Peoria Railway refunding.....	5	\$1,754,000
Detroit, Ypsilanti, Ann Arbor & Toledo Ry. consolidated.....	5	1,610,000
Detroit, Ypsilanti & Ann Arbor Railway, consolidated.....	6	330,000
Fitchburg & Leominster Street Railway consolidated.....	7	300,000
Philadelphia Rapid Transit Company, equipment trust G.....	5½	237,500
Pittsburgh Railways car trust.....	6	200,000
Western Massachusetts Street Railway 1st.....	5	200,000
		\$4,631,000
March		
Interborough Rapid Transit Company equipment trust, A....	6	\$280,000
Clinton Street Railway 1st.....	5	400,000
		\$680,000
April		
Kankakee Electric Railway 1st.....	6	\$200,000
Rockville, Broad Brook & Eastern Windsor Railway.....	5	200,000
		\$400,000
May		
Indiana, Columbus & Eastern Traction refunding.....	5	\$6,400,000
North Hudson County Railway ext.....	6	1,291,000
West Philadelphia Passenger Railway 2nd.....	5	750,000
Wheeling & Western 1st.....	5	235,000
		\$8,676,000
June		
Roxboro, Chestnut Hill & Norris Railway.....	5	\$371,000
Detroit & Pontiac Railway consolidated.....	4½	362,000
Shawnee-Tecumseh Traction 1st.....	5	300,000
Goff Falls, Litchfield & Hudson Railway 1st.....	5	200,000
Frostburg, Eckenington & Cumberland 1st.....	5	230,000
Lonaconing, Midland & Frostburg Railway.....	5	200,000
		\$1,663,000
July		
Grand Rapids, Grand Haven & Muskegon 1st.....	5	\$1,500,000
Brunswick Traction gold.....	5	500,000
		\$2,000,000
August		
Brownsville Avenue Street Railway, (Pittsburgh), 1st.....	5	\$300,000
Philadelphia Rapid Transit equipment trust G.....	5½	237,500
Worcester & Blackstone Valley Railway.....	4½	200,000
		\$737,500
September		
None		
October		
United Railways, St. Louis, receiver's certificates.....	6	\$4,200,000
		\$4,200,000
November		
Interborough Rapid Transit equipment trust C.....	6	\$570,000
		\$570,000
December		
Chicago, Aurora & Elgin Railroad two year.....	6½	\$750,000
Philadelphia Rapid Transit equipment trust H.....	5½	759,290
		\$1,509,290
Total of all public utilities:		
1926.....		\$26,644,790
1925.....		\$28,224,000

is now being attempted by the roads in the Central West, but some bankers do not hold to the same views about passenger equipment. The definite position is taken by one of the largest houses of original issue that the ability of the management, the record of earnings of the past, the political situation and the degree of co-ordination of bus and trolley service would be the sole basis upon which it would judge a proposal to sell equipment trust obligations to the public. Of course, it would not stand sponsor for an issue of bonds secured by a type of car that might be considered a freak, but the type of car would be incidental to the other factors. On the other hand, other houses of issue while weighing all the points previously mentioned would be guided to a very large extent by the suitability of the equipment for use in an emergency in a city other than the one for which it was originally intended. There is no need here to stress the favor with which steam railroad equipment trust obligations are regarded. The fields differ greatly in extent, but it is generally felt

that the electric railways have much to learn from the steam railroads in this respect.

Lastly it is of interest to note the extent of the recognition received by the report of the advisory committee on electric railway finance. Not in just the words of the committee, but over and over again representatives of banking houses gave expression in their own words to the opinion so ably expressed by the committee in its report to the effect that there are too many examples of electric railway properties which have been revitalized by new managements and new technical equipment, by recasting financial structures, and by modernized methods of salesmanship, for anyone to conclude in any way other than that the electric railway industry is fundamental and that its troubles have been the result of a combination of unprecedented and uncontrollable economic factors. Bankers expect that the financial problem, in those cases where it is a problem, will be attacked with the courage with which the other railway problems are now being attacked.

Track Extensions Show Substantial Gain Over Previous Years

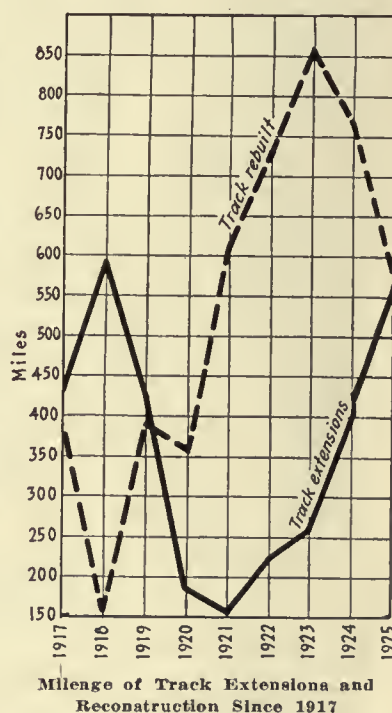
Electric Railway Mileage Added During Past Twelve Months Is Larger than in Any Other Year Since 1918—Extensions to City and Interurban Trackage Show Increases Over 1924 — More than Twice as Much Steam Railroad Mileage Was Electrified

FOR the fourth successive time, the mileage of new electric railway track added during the year exceeded that of the preceding twelve-month period. New track added during 1925 was approximately 340 miles. Extensions to city trackage amounted to a little more than 225 miles, a gain over 1924 and the largest figure since 1917. Interurban extensions totaled about 112 miles, a substantial increase over the preceding year and also the largest figure since 1917. Electrification of steam railroad lines, amounting to somewhat over 230 miles, was more than double that of the year before. Thus the total of all extensions was approximately 580 miles, or more than for any other year since 1918.

Most notable were the extensions to city track mileage in the Central, Southern, and Western states, each of which group added more urban trackage in 1925 than in the previous year. The Central and Southern groups also added more interurban mileage during the past twelve months than they did the year before. In the

Western group, however, the new interurban mileage was less than in 1924. Extensions in the New England and Eastern states and in Canada totaled somewhat less for 1925 than for the preceding year.

The largest single extension made during the year was an addition of 56 miles to the interurban trackage of the Chicago, North Shore & Milwaukee Railroad, involving the construction of the Waukegan cut-off. Plans for this undertaking were described in considerable detail in the



Summary of Track Construction for 1925

	New England States	Eastern States	Central States	Southern States	Western States	Canada	Grand Total
Track Extensions							
No. of companies...	6	17	30	11	26	10	100
Miles of urban track	4,554	27,265	72,705	24,006	52,111	46,671	227,312
Miles of interurban track	0,559	8,906	64,449	12,527	22,862	3,180	112,483
Total miles built	5,113	36,171	137,154	36,533	74,973	49,851	339,795
Track Reconstruction							
No. of companies...	15	44	61	17	27	15	179
Miles of urban track	54,861	149,925	155,646	34,504	65,210	25,600	485,746
Miles of interurban track	23,165	27,978	26,916	1,000	11,126	2,970	93,155
Total miles rebuilt	78,026	177,903	182,562	35,504	76,336	27,480	578,901

issue of ELECTRIC RAILWAY JOURNAL for July 26, 1924.

Electrification of steam railroad lines was carried out by five companies. In point of mileage the largest enterprise of this kind was that of the Staten Island Rapid Transit Company, a subsidiary of the Baltimore & Ohio Railroad, approximately 56 single-track miles being changed over to electric operation. The Babylon

Track Built and Rebuilt During 1925—(Concluded)

Name of Company	Extension Miles City	Interurban	Rebuilt Miles City	Interurban	Name of Company	Extension Miles City	Interurban	Rebuilt Miles City	Interurban
California					Washington				
Key System Transit Co.			13.840	0.170	Grays Harbor Ry. & Lt. Co.			0.142	
Los Angeles Ry.	3.900		1.000		Port Sound Int'l Ry. & Pwr. Co.		0.227		
Market St. Ry.	0.546		4.274	0.076	Seattle Munic St. Ry.	6.134		3.040	
Municipal Ry. of San Francisco	5.260		0.500		Spokane United Rys.			1.750	
Pacific Elec. Ry.	0.920	11.390	5.870	8.910	Tacoma Ry. & Pwr. Co.			2.000	
Peninsular Ry.	0.025		0.410		Total	52.111	22.862	65.210	11.126
Petaluma & Santa Rosa R.R.		0.52			CANADA				
Sacramento Northern R.R.		1.73			Alberta				
San Diego Elec. Ry.	3.240				Lethbridge Municipal Ry.			0.947	
San Francisco, Napa & Calistoga Ry.		1.400			British Columbia				
Santa Barbara & Suburban Ry.			0.205		British Columbia Elec. Ry.	1.780		0.700	
Colorado					Manitoba				
Denver & Intermountain R.R.		0.017			Brandon Municipal St. Ry.			1.000	
Denver Tramway	1.033	0.293	6.488	0.016	Winnipeg Elec. Co.	2.370		0.380	
Fort Collins Municipal Ry.	0.500				New Brunswick				
Kansas					New Brunswick Pwr. Co.			2.250	
Topeka Ry.			0.759		Ontario				
Nebraska					Cornwall St. Ry.			0.500	
Lincoln Traction Co.			0.265		Hydro-Electric Rys.	5.600		1.110	
Omaha & Council Bluffs St. Ry.			6.000		London St. Ry.			0.519	
Omaha, Lincoln & Beatrice Ry.	0.150		0.380		Niagara, St. Catharines & Toronto Ry.	0.587		0.617	
New Mexico					Ottawa Electric Ry.	4.820		1.510	
Las Vegas Transit Co.			0.500		Toronto Transportation Com.	16.465		1.541	
Oklahoma					Quebec				
Northeast Oklahoma R.R.		2.452			Hull Electric Co.	0.100			
Oklahoma Ry.		1.500	0.8		Montreal Tramways	14.350	3.180	12.180	2.970
Oklahoma Union Ry.	1.500		0.500		Quebec Ry., Lt. & Pwr. Co.	0.580		0.786	
Pittsburg County Ry.	0.682	0.133	0.284		Sherbrooke Ry. & Pwr. Co.			0.470	
Oregon					Saskatchewan				
Portland Elec. Pwr. Co.	4.180		2.110		Moose Jaw Elec. Ry.			1.090	
Texas					Regina Municipal Ry.	0.019			
Dallas Ry.	8.959					0.019		1.090	
Eastern Texas Electric Co.	0.210		0.137		Total	46.671	3.180	25.600	2.970
El Paso Electric Ry.	0.057		0.660		Grand Total	227.312	112.483	485.746	93.155
Galveston Electric Co.			4.000						
Houston Electric Co.	1.315		2.660						
Laredo Electric Ry.	1.000								
Northern Texas Traction Co.			6.300	1.290					
Wichita Falls Traction Co.	12.500	3.200	1.000						

electrification of the Long Island Railroad involved about 54 track-miles. Other important undertakings were carried out by the Norfolk & Western Railroad, the Virginian Railway, and the New York, New Haven &

miles, or somewhat less than for the preceding year. The abandonments were about equally divided between urban and interurban. Nearly all of the interurban track abandoned was dismantled and removed, but a considerable part of the abandoned city trackage was allowed to remain in place.

Some seventeen electric railways abandoned all their trackage and ceased rail operation entirely. These, however, were all comparatively small companies. So far as is known, no regular transportation service is now provided in these localities. The mileage of track totally abandoned in 1925 was about 50 miles less than the 1924 figure. Track rebuilt during the year was somewhat less than in 1924, totaling a little under 600 miles. In this figure, however, is not included a large amount of track on which considerable maintenance was done, but which was not entirely rebuilt.

Electrified Steam Line Extensions

	Single Track, Miles
Staten Island Rapid Transit Co. (Baltimore & Ohio System)	56.00
Long Island Railroad	54.00
Norfolk & Western Railroad	52.75
Virginian Railway	38.40
New York, New Haven & Hartford Railroad	35.21
Total	236.36

Hartford Railroad. Mileages of these electrifications are given in an accompanying table.

Track abandoned during 1925 by electric railways which continued to operate elsewhere totaled about 240

Comparison of Track Construction by Years

Year	No. of Companies	Urban Track	Interurban Track	Electrified Steam Lines	Total	Track Rebuilt
1907	(n)	(a)	(a)		1,880.00	(a)
1908	157	1,174.5		84.00	1,258.50	(a)
1909	160	774.7		112.40	887.16	(a)
1910	217	1,204.8		192.40	1,397.20	(a)
1911	223	1,105.0		86.50	1,191.50	(a)
1912	171	869.4		80.80	950.20	(a)
1913	181	974.9		119.00	1,093.90	(a)
1914	163	716.5		229.00	946.40	(a)
1915	136	596.0		448.20	1,044.20	(a)
1916	104	115.40	240.90	388.00	744.30	(n)
1917	121	251.10	125.60	66.00	442.70	375.40
1918	80	216.41	97.41	275.70	589.53	155.43
1919	73	110.90	29.67	287.60	428.17	390.64
1920	87	145.69	30.87	8.92	185.48	361.77
1921	78	108.15	38.95	8.08	155.18	615.21
1922	104	126.27	85.11	12.35	223.73	739.70
1923	272	169.61	63.54	26.00	259.15	854.63
1924	243	218.085	93.988	83.39	395.463	764.323
1925	207	227.312	112.483	236.36	576.155	578.901

Entire Properties Abandoned in 1925

Albia Light & Railway	0.00
Arkansas City-Winfield Northern Interurban Railway	20.50
Cleveland & Chagrin Falls Railway	12.00
Cleveland & Eastern Traction Company	40.00
Danville & Sunbury Transit Company	2.80
Gainesville Railway	0.00
Illinois Light & Traction Company	6.00
Jersey Shore & Antea Fort Railroad	2.75
Kentucky Utilities Company	3.30
Nassau County Railway	10.00
New Paltz, Highland & Poughkeepsie Traction Company	9.27
Skipack & Perkiomen Transit Company	13.00
Southeastern Ohio Railway	16.00
Troy & New England Railway	10.11
Valdosta Street Railway	5.25
Wahpeton Breckenridge Street Railway	1.00
Waupaca Electric Service & Railway	5.21
Total	174.19

(a) Information not available.

Car Purchases During 1925 Were Below Requirements

Reduction in the Number of New Cars Ordered This Year Emphasizes the Importance of Directing Increased Attention to Replacement of Obsolete Equipment—New England Was the Only Section Reporting Increased Purchases Over Last Year

NEW car purchases during 1925 show a material reduction below previous years. The statistics of new rolling stock given in the tables and charts herewith indicate that electric railways have not only failed to buy equipment over a period of years at a rate sufficient to provide adequate replacements, but have seriously fallen behind their average during the past year. The need for directing increased attention to the subject of replacing obsolete equipment at a rate sufficient to keep pace with modern transportation standards thus becomes obvious. The total of 1,659 cars and electric locomotives ordered during 1925 is the second lowest recorded for any year since 1907. The lowest was in

NEW ROLLING STOCK ORDERED DURING LAST FIVE YEARS

Year	Passenger Cars			Express, Freight, Service, Locomotives and Miscellaneous	Grand Total
	City	Interurban	Total		
1921	1,059	129	1,188	88	1,276
1922	2,912	187	3,099	439	3,538
1923	2,915	427	3,342	687	4,029
1924	1,985	538	2,523	1,569	4,092
1925	1,054	320	1,374	285	1,659

1921 with a total of 1,276 cars and electric locomotives. Purchases of buses by electric railways, on the other hand, show a large increase over previous years. Detailed statistics on this subject are given in another article in this issue.

Information received from practically every electric railway in the United States and Canada shows

that there were 94 companies that bought new cars during 1925, but that the majority of purchases were confined to fifteen companies, which accounts for a total of 965 of the new passenger cars. The railways that purchased twenty or more cars are shown in Table III.

The special comparisons of types of cars which were purchased during 1925 as given in Table VI and in several of the diagrams show that for city service the one-man two-man type of car is being bought in greatest quantities. Cars for rapid transit service form 14.4 per cent of the orders, two-man cars 22 per cent, and the one-man car but 11.6 per cent. One of the charts illustrates in a very striking manner the rise and fall in popularity of the one-man car of approximately 28-ft. length which is commonly known as the safety car, and the rapid increase in popularity of the one-man two-man car which first made its appearance in 1922. For city service there were 512 one-man two-man cars purchased last year and 245 two-man cars. Motor cars for rapid transit service constitute the next greatest number, there being 160 of these. There were 129 one-man cars. Of this latter class, 55 were with bodies approximately 28 ft. long, 56 were single-truck cars with bodies longer

Table I—New Rolling Stock Ordered Since 1907

Year	Passenger Cars		Freight and Miscellaneous Cars	Electric Locomotives	Total
	City	Interurban			
1907	3,483	1,327	1,406	(a)	6,216
1908	2,208	727	176	(a)	3,111
1909	2,537	1,245	1,175	(a)	4,957
1910	3,571	990	820	(a)	5,381
1911	2,884	626	505	(a)	4,015
1912	4,531	783	687	(a)	6,001
1913	3,820	547	1,147	(a)	5,514
1914	2,147	384	479	(a)	3,010
1915	2,072	336	374	(a)	2,782
1916	3,046	374	491	31	3,942
1917	1,998	185	223	49	2,455
1918	1,842	255	278	44	2,419
1919	2,129	128	172	18	2,447
1920	2,889	227	465	17	3,598
1921	1,059	129	81	7	1,276
1922	2,912	187	405	34	3,538
1923	2,915	427	595	92	4,029
1924	1,985	538	1,538	31	4,092
1925	1,054	320	238	47	1,659

(a) Included in "Freight and Miscellaneous Cars."

Table II—Special Comparison of New Rolling Stock Orders by Years

	1925	1924	1923	1922	1921	1920	1919	1918	1917	1916
Number of railways reporting new cars.....	94	119	167	145	94	172	160	140	182	250
City Service										
Number of one-man cars (28-ft. body S. T.).....	55	103	312	772	565	1,699	1,383	644	280	187
Number of one-man cars other than 28-ft. body.....	74	96	183	227	.....	.....	.....	.....	.....	.....
Number of one-man, two-man cars.....	512	1,224	1,076	471	.....	.....	.....	.....	.....	.....
Number of two-man passenger motor cars*.....	405	537	1,097	1,290	383	847	635	1,068	1,316	2,731
Number of passenger trailers.....	8	25	247	150	111	343	111	130	402	128
Service cars.....	70	44	121	103	47	104	31	(a)	(a)	(a)
Total cars city service.....	1,124	2,029	3,036	3,015	1,106	2,993	2,160	1,842	1,998	3,046
Interurban Service										
Number of one-man cars.....	3	61	56	40	.....	.....	.....	.....	.....	.....
Number of one-man, two-man cars.....	70	38	38	9	.....	.....	.....	.....	.....	.....
Number of two-man motor cars*.....	207	435	330	122	103	195	96	200	158	303
Number of passenger trailers.....	40	4	3	16	26	32	32	55	27	71
Number of freight, express and miscellaneous cars.....	168	1,494	474	302	34	361	141	(a)	(a)	(a)
Total cars interurban service.....	488	2,032	901	489	163	588	269	255	185	374
Total number of cars.....	1,612	4,061	3,937	3,538	1,269	3,581	2,429	2,375	2,406	3,911
Number of electric locomotives.....	47	31	92	34	7	17	18	44	49	31

*Includes motor and trail cars for subway, elevated and train service. (a) Not available.

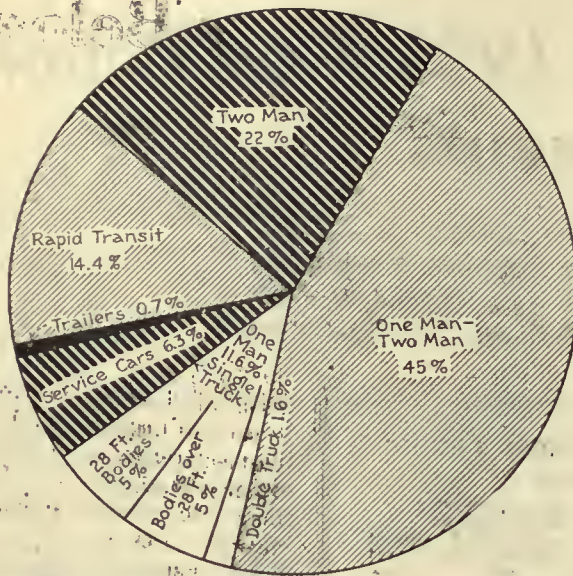
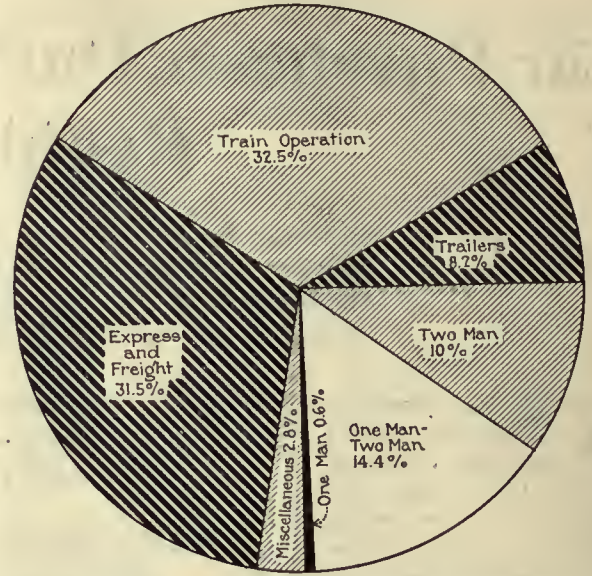


Diagram Showing the Proportion of Total City Cars for Each Type Purchased in 1925



This Shows the Various Types of Interurban Cars Purchased Last Year as a per Cent of the Total for This Class

Table III—Companies Purchasing 20 or More Passenger Cars

Boston Elevated Railway.....	100	surface cars and 60 rapid transit cars
Pittsburgh Railways.....	83	one-man two-man city cars and 20 one-man two-man interurban cars
Chicago Rapid Transit Company.....	100	motor cars for rapid transit service
Philadelphia Rapid Transit Company.....	100	one-man two-man surface cars
Baltimore & Ohio Railroad.....	90	motor cars and 10 trailers for rapid transit service
Cleveland Railway built.....	95	two-man cars in its shops
Georgia Railway & Power Company.....	40	one-man two-man city cars and 20 two-man cars
Key System Transit Company.....	42	city cars of two-man type
Chicago, South Shore & South Bend Railway.....	15	interurban passenger cars, 10 combination passenger and baggage cars, 2 parlor car trailers and 2 diner trailers
New York, New Haven & Hartford Railroad.....	13	motor cars and 22 trailers for train operation
Grand Rapids Railway.....	27	one-man two-man city cars
United Electric Railways of Providence.....	25	one-man two-man city cars
Chicago, North Shore & Milwaukee Railway.....	20	interurban motor cars and 4 diner trailers
Market Street Railway, San Francisco, built.....	24	two-man city cars
Columbus Railway & Power Company.....	23	two-man city cars
United Railways of Baltimore.....	22	one-man two-man city cars
Manila Electric Railway.....	20	two-man city cars

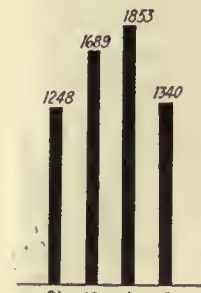
than 28 ft., and eighteen of these one-man units were double-truck cars.

The analysis of cars bought for interurban service shows that those purchased for train operation constitute the greatest number, there being 158 motor cars and 40 trailers or more than 40 per cent of the total interurban passenger cars purchased. Next to these, the one-man two-man type of car proved most popular.

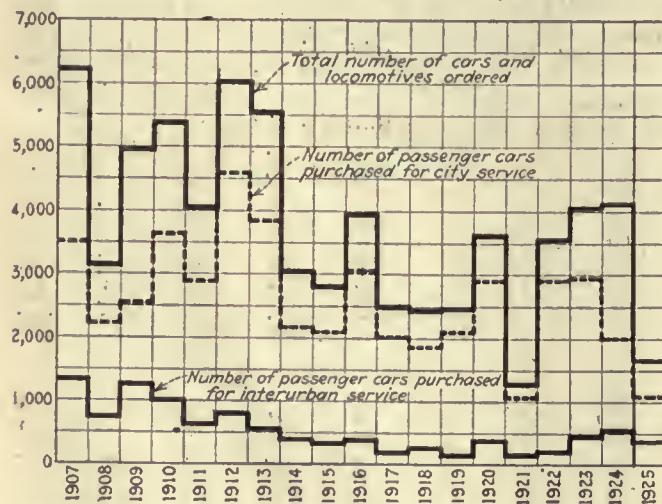
There were but three one-man cars purchased for interurban service.

Purchases of electric locomotives were slightly greater last year than for 1924, there being 47 electric locomotives bought during 1925 as compared with 31 during 1924. The order of the Pennsylvania Railroad for 24 locomotives of 75 tons each constitutes the greatest proportion of those ordered. The remaining 23 locomotives were distributed among twelve other companies.

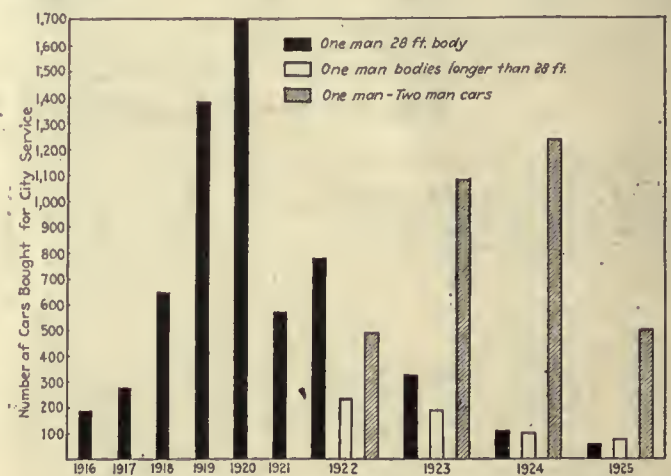
A special comparison of cars ordered during the past ten years is given in Table II. Separate tabulations are



Number of Cars Reported as Junked During Last Four Years



Graphical Analysis of Total Cars and Locomotives and Passenger Cars for City and Interurban Purchased During Past Nineteen Years



Graph Showing Relative Purchases of One-Man and One-Man, Two-Man Cars During the Past Ten Years

Table IV—Details of Rolling Stock Ordered During 1925

Name of Company	No.	Class	City or Interurban	Motor or Trailer	Single or Double Truck	Length Over All Ft. In.	Total Wt. Light Tons	No. Motors	Seating Capacity	One or Two Man	No. Cars Junked During Year
New England States											
Connecticut											
Connecticut Co.	1	Derrick	City	Motor	Double	40—0	32.70				
New York New Haven & Hartford R.R.	13	Passenger	Interurban	Motor	Double	80—1½	87.75	4	120	Train	
New York New Haven & Hartford R.R.	22	Passenger	Interurban	Trailer	Double	80—1½	52.00		120	Train	
Maine											
Androscoggin Kennebec Ry.	1	Work	City	Motor	Double	24—0	21.5				6 CM
Cumberland County Pwr. & Lt. Co.	1	Work	City	Motor	Double	37—0					3 CM
Massachusetts											
Boston Elevated Ry.	60	Passenger	City	Motor	Double	69—2½	41.00	2	72	Train	
	100	Passenger	City	Motor	Double	45—0	15.50	4	48	Both	
Eastern Mass. St. Ry.											82 CM
											14 SP
											5 SM
East Taunton St. Ry.	2	Passenger	City	Motor	Double	36—10	15.25	4	40	Both	
Interstate Consolidated St. Ry.	3	Passenger	City	Motor	Single	28—0½	8.05	2	33	One	
Interstate Consolidated St. Ry.	5	Passenger	City	Motor	Double	40—3		4	44	Both	
Middlesex & Boston St. Ry.											46 CM
Springfield St. Ry.	1	Passenger	City	Motor	Double	41—0	12.00	4	44	Both	
New Hampshire											
Portsmouth El. Ry.											15 CM
Rhode Island											
United Elec. Rys. (Providence)	25	Passenger	City	Motor	Double	41—0	15.50	4	38	Both	
Total cars New England States											
	234										
Eastern States											
District of Columbia											
Washington Ry. & Elec. Co.	2	Sweepers	City	Motor	Single	28—4	16.25				
Maryland											
Baltimore & Ohio R.R. Co. (Staten Is. Lines)	90	Passenger	Interurban	Motor	Double	67—3½	47.875	2	71	Train	
Baltimore & Ohio R.R. Co. (Staten Is. Lines)	10	Passenger	Interurban	Trailer	Double	67—3½	41.65		71	Train	
United Rys. & Elec. Co.	22	Passenger	City	Motor	Double	44—10	20.50	2	49	Both	83 CM
United Rys. & Elec. Co.	1	Crane and Plow	City	Motor	Double	44—0	34.00	4			
New York											
Binghamton Ry.	5	Passenger	City	Motor	Double			4	34	Both	
Brooklyn-Manhattan Transit Co.	2	Freight	City	Trailers	Double						472 CM
Brooklyn-Manhattan Transit Co.	2	Crane	City	Trailer	Double	44—0	25.00				
Elmira Water, Lt. & R.R. Co.	2	Passenger	City	Motor	Single	27—9½	18.34	2	32	One	
Interborough Rapid Transit Co.											4 CM
New York & Long Island Tract. Co.	1	Sweeper	City	Motor	Single	28—6	12.00	2			16 CM
Poughkeepsie & Wappinger Falls Ry.											
Schneetady Ry.	12	Passenger	City	Motor	Double	41—4½	17.25	4	44	One	
Schneetady Ry.	1	Dump	City	Motor	Double	40—0	25.00	4			4 IM
Southern New York Ry., Inc.											
Pennsylvania											
Allegheny Valley St. Ry.	1	Sweeper	City	Motor	Single	28—3	13.00				
Altoona & Logan Valley Elec. Ry.	13	Passenger	City	Motor	Double	41—10	18.20	4	44	Both	25 STCM
Conestoga Traction Co.	3	Passenger	City	Motor	Single	30—0	9.00	2	31	One	
Harrisburg Railways	4	Passenger	Interurban	Motor	Double	60—6	40.50	2	72	Two	6 CMO
Lackawanna & Wyoming Valley R.R.	13	Passenger	City	Motor	Double	48—8	24.50	4	70	Two	8 CM
Lehigh Traction Co.	8	Passenger	Interurban	Motor	Double	54—0	58.30	2	72	Train	
Pennsylvania R.R.	100	Passenger	City	Motor	Double	45—6	18.31	2	53	Both	101 CM
Philadelphia Rapid Transit Co.	1	El. Crane	City	Motor	Double	55—0	46.82	4			49 Work
Philadelphia Rys.											3 CM
Philadelphia & West Chester Trac. Co.	12	Passenger	Interurban	Motor	Double	47—10	29.82	4	62	Two	
Pittsburgh Railways	83	Passenger	City	Motor	Double	45—2	18.75	4	52	Both	
Pittsburgh Railways	20	Passenger	Interurban	Motor	Double	45—2	19.75	4	50	Both	
Reading Transit Co.	1	Sweeper	City	Motor	Double						5 CMO
Seranton Ry.	10	Passenger	City	Motor	Double	41—10	18.50	4	44	Both	
Shamokin & Mt. Carmel Transit Co.	3	Passenger	Interurban	Motor	Double	45—0	17.89	4	48	Both	2 CM
Stroudsburg Traction Co.											
Webster, Monessen, Belle Vernon & Fayette City St. Ry.	3	Passenger	City	Motor	Double	41—2	17.50	4	46	Both	
West Side Elec. St. Ry.	3	Passenger	City	Motor	Double	41—2	17.50	4	46	Both	
Virginia											
Virginia Ry. & Pwr.	15	Passenger	City	Motor	Double	40—1			40	Both	
Total cars Eastern States											
	443										
Central States											
Illinois											
Chicago North Shore & Milwaukee R.R.	3	Freight	Interurban	Motor	Double	36—0					4 CM
	20	Passenger	Interurban	Motor	Double	55—3½	51.00	4	54	Train	
	4	Diner	Interurban	Trailer	Double	55—3½	51.50		24	Train	
	5	Freight	Interurban	Trailer	Double	50—0	34.00			Train	
Chicago Rapid Transit Co.	1	Passenger	City	Motor	Double						
East St. Louis & Suburban Ry.	100	Dump	City	Trailer	Double	40—0	16.00			Train	
Illinois Pwr. & Lt. Corp. (Galesburg)											14 CM
Illinois Traction Inc.	100	Freight	Interurban	Trailer	Double	36—0				Train	
Kewanee & Galva Ry.	1	Passenger	Interurban	Motor	Double	40—3	13.00	4	50	One	
Indiana											
Burch Grove Traction Corp.	15	Passenger	Interurban	Motor	Double	60—0			56	Train	2 IM
	10	Passenger									
Chicago South Shore & South Bend Ry.		Baggage	Interurban	Motor	Double	60—0			44	Train	
	2	Parlor	Interurban	Trailer	Double	64—0			37	Train	
	2	Diner	Interurban	Trailer	Double	64—0			24	Train	
Evansville & Ohio Valley Ry.	6	Passenger	Interurban	Motor	Double	44—4	17.00	4	48	Both	
Gary Street Ry.	5	Passenger	City	Motor	Single	30—0	6.00	2	32	One	
Gary & Hobart Trac. Co.	3	Passenger	Interurban	Motor	Double	44—8½	21.26	4	44	Both	
	5	Passenger	Interurban	Motor	Double	61—6	46.00	4	50	Two	
Indiana Service Corp.	6	Dump	Interurban	Trailer	Double	40—0	17.00				
	2	Passenger	Interurban	Motor	Double	61—6	42.50	2	50	Train	
Interstate Public Service Co.	1	Parlor & Dining	Interurban	Motor	Double	59—0	46.50	2	24	Two	
Interstate Public Service Co.	6	Work	Interurban	Trailer	Double	40—0	18.30				
Northern Indiana Pwr. Co.	2	Freight	Interurban	Trailer	Double	25—0					
Union Traction Co. of Indiana	15	Passenger	Interurban	Motor	Double	65—5	45.00	4	60	Two	
Iowa											
Iowa Southern Utilities Corp. (Burlington)	1	Sweeper	City	Motor							

Table IV—Details of Rolling Stock Ordered During 1925—(Continued)

Name of Company	No.	Class	City or Interurban	Motor or Trailer	Single or Double Truck	Length Over All Ft. In.	Total Wt. Light Tons	No. Motors	Seating Capacity	One or Two Man	No. Cars Junked During Year
Kentucky											
Kentucky Traction & Terminal Co.	2	Passenger	City	Motor	Single	26—6	9.00	2	24	One	2 CM
Michigan											
Dept. Street Railways (Detroit)	6	Dump	City	Trailer	Double	40—0	17.00				
Dept. Street Railways (Detroit)	2	Dump	City	Motor	Double	40—0	25.00	4			10 CM
Detroit United Ry.											30 CM
											2 SM
Grand Rapids Ry.	27	Passenger	City	Motor	Double	37—1		4	43	Both	
Lake Superior District Power Co.	1	Passenger	Interurban	Motor	Double	40—6	13.00	4	44	One	4 CM
Menominee & Marinette Lt. & Trac. Co.											
Minnesota											
Twin City Rapid Transit Co.	5	Passenger	City	Motor	Double	35—10	12.10	4	43	One	
	1	Passenger	City	Motor	Double	46—8	12.25	4	57	Two	
	1	Passenger	City	Motor	Double	46—8	13.40	4	50	Two	
Missouri											
Missouri & Kansas Ry.	2	Passenger	Interurban	Motor	Double	45—0	20.00	4	54	Both	
Missouri & Kansas Ry.	1	Passenger	Interurban	Motor	Double	47—0	21.00	4	54	Both	
United Rys. Co. of St. Louis											32 CM
Ohio											
Cincinnati St. Ry. (Traction Co.)	1	Dump	City	Trailer	Double	42—0	34.00	4			
Cincinnati Trac. Co.	1	Crane	City	Motor	Double	44—0	34.00	4			
Cincinnati Trac. Co.	1	Dump	City	Trailer	Double	40—0	16.00				
	95	Passenger	City	Motor	Double	51—2	20.80	4	55	Two	
	4	Crane	City	Motor	Double	44—0	34.00	4			
Cleveland Railways	4	Dump	City	Motor	Double	40—0	25.00	4			
	2	Dump	City	Trailer	Double	40—0	16.00				
	2	Rail cars	City	Trailer	Double	64—0					
	3	Sweepers	City	Motor	Double						
Cleveland So. Western Ry. & Lt. Co.	2	Parlor	Interurban	Motor	Double	63—4	56.75				8 CM
Columbus, Delaware & Marion Elec. Co.	23	Passenger	Interurban	Motor	Double	45—3	18.31	4	48	Two	
Dayton, Springfield & Xenia Southern Ry.	1	Passenger	Interurban	Motor	Double	42—9	13.00	4	52	Both	
Lima Toledo R.R. Co.	10	Freight	Interurban	Trailer	Double	49—5	20.00				
Northern Ohio Trac. & Lt. Co.	25	Freight	Interurban	Trailer	Double	49—8					
Northern Ohio Trac. & Lt. Co.	6	Freight	Interurban	Trailers	Double	42—6					
Ohio River Elec. Ry. Co.	7	Passenger	City	Motor	Single	26—6	9.00	2	24	One	
Pennsylvania-Ohio Elec. Co.	13	Passenger	City	Motor	Double	43—0	16.00	4	44	Both	14 CM
											18 IM
											1 IT
Stark Elec. Co.	1	Dump	Interurban	Trailer	Double	40—0	16.00				
Toledo, Bowling Green & Southern Trac. Co.	1	Freight	Interurban	Motor	Double	51—0	39.50				
Youngstown Municipal Ry.	13	Passenger	City	Motor	Double	43—0	16.00	4	44	Both	
Youngstown & Suburban Ry.	4	Passenger	Interurban	Motor	Double	41—10	17.80	4	44	Both	
Wisconsin											
Lake Superior Dist. Pwr. Co.	1	Passenger	Interurban	Motor	Double	40—3	17.25	4	50	Both	
Madison Railways	12	Passenger	City	Motor	Single	28—10	9.00	2	32	One	
Milwaukee Elec. Ry. Lt. Co.	2	Passenger	City	Trailer	Double	53—5	18.10				16 CM
Wisconsin Pwr. & Lt. Co.											2 Salt
											1 Work
											1 IM
Total cars Central States	597										
Southern States											
Alabama											
Alabama Pwr. Co.	2	Passenger	City	Motor	Single	32—0	7.50	2	32	One	
Mobile Light & R.R. Co.	2	Flat	City	Motor	Double	36—0	6.00				3 CM
Mobile Light & R.R. Co.	2	Work	City	Motor	Single	24—0	4.00				
Arkansas											
Pine Bluff Co.	2	Passenger	City	Motor	Single	28—0	8.00	2	32	One	
Florida											
Coral Gables Utility Corp.	2	Passenger	Interurban	Motor	Double	40—1		4	44	Both	
	1	Passenger	Interurban	Motor	Double	47—8	18.82	4	52	Both	
	3	Passenger	Interurban	Motor	Double	28—0	8.61	2	33	One	
	9	Passenger	Interurban	Motor	Double			4		One	
Miami Trac. Co.	15	Passenger	City	Motor	Double	28—0	8.61	2	33	One	
Municipal Railway of South Jacksonville	4	Passenger	City	Motor	Single	28—0				One	
Tampa Elec. Co.	7	Passenger	City	Motor	Double	45—7	16.00	4	52	Both	
Georgia											
Atlanta Northern Ry.	5	Passenger	Interurban	Motor	Double	46—5	18.00	4	51	Both	16 CM
Columbus Elec. & Pwr. Co.	20	Passenger	City	Motor	Double	46—2	18.22	4	48	Two	60 CM
Georgia Ry. & Pwr. Co.	40	Passenger	City	Motor	Double	46—4	18.64	4	50	Both	4 CM
Savannah Elec. & Pwr. Co.											
North Carolina											
Asheville Pwr. & Light Co.	12	Passenger	City	Motor	Single	28—0	8.34	2	33	One	
Asheville Pwr. & Light Co.	4	Passenger	City	Motor	Single	33—0	11.10	2	40	One	
Tide Water Power Co.											3 CM
Tennessee											
Knoxville Pwr. & Lt. Co.	16	Passenger	City	Motor	Single	29—6	8.50	2	29	One	
Union Trac. Co.	1	Passenger	Interurban	Motor	Double	43—1	15.00	4	42	Two	
	1	Freight	Interurban	Motor	Double	43—1	15.00				
	1	Work	Interurban	Trailer							
Total cars Southern States	149										
Western States											
California											
Key System Transit Co.	41	Passenger	City	Motor	Double	45—6	20.50	4	48	Two	10 CM
	1	Passenger	City	Motor	Double	48—0	24.00	4	52	Two	
	1	Work	City	Trailer	Double	20—4					
Market Street Ry.	24	Passenger	City	Motor	Double	47—0	19.50	4	50	Two	10 CM
Pacific Electric Ry.											14 CM
											6 CS
											33 IF
San Diego El. Ry.	6	Work	City	Trailer	Double	40—0	23.00				
Kansas											
Topeka Ry.											10 CM
Oklahoma											
Northeast Oklahoma R.R.											2 CM
Oklahoma Ry.	10	Passenger	City	Motor	Single	30—0	8.00	2	32	One	

Table IV—Details of Rolling Stock Ordered During 1925—(Concluded)

Name of Company	No.	Class	City or Interurban	Motor or Trailer	Single or Double Truck	Length Over All Ft. In.	Total Wt. Light Tons	No. Motors	Seating Capacity	One or Two Man	No. Cars Junked During Year
Oregon											
Portland Electric Pwr. Co.											4 CM
Texas											
El Paso Elec. Ry. Co.											5 CM
Southeastern Traction Co.	1	Passenger	Interurban	Motor	Double	30—0	10.50	2	32	One	
Total cars Western States	84										
Cuba											
Havana Central R.R.	8	Passenger	Interurban	Motor	Double	51—9	25.10	4	60	Two	
Philippine Islands											
Manila Electric Co.	20	Passenger	City	Motor	Double	41—5	14.00	2	60	Two	
Total cars Extraterritorial	28										
Dominion of Canada											
British Columbia											
British Columbia El. Ry.	6	Passenger	City	Motor	Double	48—8	23.15	4	48	Two	1 CL
	1	Passenger	City	Trailer	Double	48—8	22.90		55	Train	1 CS
	1	Flat	Interurban	Trailer	Double	37—0	15.50				
	1	Work	City	Motor	Single	10—0	8.00	2			
New Brunswick											
New Brunswick Pwr. Co.	2	Passenger	City	Motor	Single	31—0	12.00	2	30	One	
Ontario											
Cornwall Street Ry.	1	Passenger	City	Motor	Double	30—0	12.00	2	30	One	
Hydro-Electric Pwr. Comm.	3	Passenger	City	Motor	Double	45—4	22.00	4	44	Both	
Hydro-Electric Pwr. Comm.	1	Passenger	Interurban	Motor	Double	50—0	27.00	4	54	Two	
Niagara, St. Catharines & Toronto Ry.	12	Passenger	City	Motor	Double	46—6	14.90	4	44	Both	
Oshawa Ry.	1	Work	City	Motor	Motor						
Ottawa Electric Ry.	10	Passenger	City	Motor	Double	45—0	19.50	4	54	Both	
Ottawa Electric Ry.	2	Sweeper	City	Motor	Single	24—10		2			
Public Utilities Comm. of Kitchener	1	Sweeper	City	Motor	Single	22—0					
Quebec											
Canadian National Rys.	12	Passenger	Interurban	Motor	Double	42—6	15.00	4	44	Both	
	3	Sweeper	City	Motor	Single	24—10	16.00	2			
	1	Plow	City	Motor	Single	26—0	19.00	2			
Montreal Tramways	1	Dump	City	Motor	Double	40—0	25.15	4			
	2	Rail	City	Motor	Double	42—0	24.50	4			
	4	Flat	City	Motor	Double	34—0	20.75				48 CM
New Foundland Lt. & Pwr. Co.	7	Passenger	City	Motor	Single	28—0½	11.00	2	30	One	
Total cars Canada	77										

Abbreviations used for cars junked.

CM—city motor cars.

CMO—open city motor cars.

CS—city service cars.

CL—city line cars.

STCM—single truck city motor cars.

SP—snow plows.

SM—service motor cars.

IM—interurban motor cars.

IT—interurban trailers.

IF—interurban freight cars.

given for cars in city service and those in interurban service. Referring to this table, it is interesting to note how the number of safety cars purchased increased each year from 1916 up to and including 1920, and during the same period how the number of large two-man cars gradually decreased. A comparison by percentage that the number of cars purchased bears to the total shows that the highest percentage for safety cars was reached in 1919. One-man, two-man cars increased each year from 1922 to 1924, but the number purchased during 1925 has fallen off to less than one-half those purchased during 1924.

Details of rolling stock ordered by individual companies are given in Table IV. The railways in each state are grouped and the various states are arranged into groups which follow the same arrangement as that used by the United States Census Bureau. This arrangement is the same as that used for the 1924 statistics. Companies in Canada, Cuba and the Philippine Islands are listed separately. In addition to listing the number of cars ordered by the various companies, this table classifies the cars as to type of service and gives information as to length, seating capacity, weight, number of motors and general characteristics, such as motor or trailer and single or double truck.

The recapitulation by districts shows that very few cars were bought by companies in the Western states, there being but five companies that reported a total of 83 city cars purchased and one company that reported new interurban cars. During 1924 this district showed the greatest number of cars purchased. Eighteen companies reported a total of 1,663 cars and locomotives

bought for city and interurban service. Omitting express, freight, service and miscellaneous cars, there were 76 passenger cars purchased for city service during 1925, as against 271 passenger cars for city service during 1924. Only one interurban car was reported for 1925 as against 27 purchased during 1924. Comparison of other districts shows that the New England district purchased 234 cars during 1925 as against 92 in 1924; the Eastern states, 443 during 1925 as compared with 1,206 in 1924; the Central states, 597 in 1925 as against 849 in 1924; and the Southern states, 149 in 1925 as compared with 158 in 1924. Canada reported 77 cars for 1925 as against 98 for 1924.

For convenience in comparing detailed figures, and in order to show at a glance the relative amount of rolling stock purchased by the various railways year by year, Table I has been prepared. This gives the total number of cars ordered each year since 1907. Cars purchased are divided into four classes: Passenger cars, both city and interurban; freight, express and miscellaneous cars; and electric locomotives. The miscellaneous cars include service cars, snow plows, sweepers, work cars, etc. Three graphs have been prepared to show graphically the number of cars ordered each year since 1916. One of these gives the total number of cars and locomotives; the second one gives purchases of passenger cars for city service and the third interurban cars bought for passenger service. The number of passenger cars bought for city service annually has been decreasing since 1923. The number purchased in 1925 is approximately the same as for 1921, which is the lowest year recorded. Purchases of interurban cars

increased from 1921 to 1924, but 1925 shows a drop of about six-tenths of the number purchased in 1924.

A study of the various one-man two-man cars ordered during 1925 for city service shows that they run quite uniform in length, weight and seating capacity. Lengths vary from 36 ft. 10 in. to 47 ft. 7 in., weights from 14.9 tons to 20.5 tons, and seating capacity from 34 to 54. The weighted average for all cars of this class purchased during 1925 gives a length of 44 ft. 1 in., a weight of 18.07 tons and a seating capacity of 48. It is interesting to compare these dimensions with similar ones made from a study of the one-man two-man cars ordered in 1923. The weighted average for the cars was 45 ft. 1 in. long with a seating capacity of 54. It thus appears that the tendency during 1925 is to use a car slightly smaller in size than those of 1923. In general design, the cars have remained about the same for the last three years. Wheels of 26-in. diameter are most commonly used and platforms are either level with the car floor or with a slight ramp, a single intermediate step being used between the roadway and the car platform. Arch type roof construction is used in most cases.

The number of cars junked during 1925 is less than for 1923 and 1924, but is slightly greater than for 1922, there being a total of 1,340 cars reported as scrapped during 1925. The majority of these are motor cars in city service. The largest number of cars reported as junked by individual railways was 472 by the Brooklyn-Manhattan Transit Corporation and 101 by the Philadelphia Rapid Transit Company, 83 by the United Railways & Electric Company of Baltimore, and 82 by the Eastern Massachusetts Street Railway. An accompanying diagram shows graphically the number of cars junked during the past four years.

The accompanying tables and graphical charts of rolling stock were prepared from information obtained from replies to questionnaires sent to all the electric railways in the United States and Canada. This was supplemented by information which had been previously obtained and published in *ELECTRIC RAILWAY JOURNAL*, and from lists of cars furnished by the principal car manufacturers. It is quite impossible to receive replies from all railways when a definite time for publication must be met, but this year's information has been particularly complete and the lists received from manufacturers has enabled a careful check to be made of the

Table VI—Recapitulation by Districts of Cars Ordered During 1925

	New England States	Eastern States	Central States	Southern States	Western States	Extra territorial	Total for United States	Total for Canada	Grand Total
Number of companies reporting new cars.....	7	21	36	12	5	2	83	11	94
City Service									
One-man cars, 28-ft. body....	3	...	9	36	..	..	48	7	55
One-man cars with bodies longer than 28-ft.	...	5	17	22	10	..	54	2	56
Double truck.....	...	12	5	..	..	..	17	1	18
One-man, two-man cars.....	133	254	53	47	..	..	487	25	512
Two-man cars (surface).....	...	13	120	20	66	20	239	6	245
Motor cars for rapid transit lines.....	60	...	100	..	..	..	160	..	160
Trailers.....	...	2	..	..	..	..	2	6	8
Service and miscellaneous cars	3	12	28	4	7	..	54	16	70
Total cars, city service....	199	296	334	129	83	20	1,061	63	1,124
Interurban Service									
One-man, double-truck cars....	...	...	2	..	1	..	3	..	3
One-man, two-man cars.....	...	23	18	17	..	..	58	12	70
Two-man cars.....	...	16	23	1	..	8	48	1	49
Trailers.....	22	10	8	..	..	..	40	..	40
Motor cars for train service..	13	98	47	..	..	..	158	..	158
Express and freight cars.....	...	...	152	1	..	..	153	1	154
Miscellaneous cars.....	...	...	13	1	..	..	14	..	14
Total cars interurban service	35	147	263	20	1	8	474	14	488
Electric locomotives.....	4	26	11	...	1	3	45	2	47
Total cars and electric locomotives.....	238	469	608	149	85	31	1,580	79	1,659

figures obtained from the various railways. In some cases where replies were not received from the operating companies, the information furnished by the car manufacturers has been used in the tables.

900 Men Rush Rehabilitation Work on South Shore Road

MANY of the tasks in the rehabilitation work begun when the Chicago, South Shore & South Bend Railroad came under the control of Samuel Insull and associates had been completed on Dec. 1. Work in other phases of this program will continue as long as weather permits. More than 900 men were still engaged in this work on Dec. 1.

Some of the work which has been completed follows:

Ten miles of 70 and 80 lb. rail between Kensington and Hammond replaced with 100-lb. rail.

Entire track from South Bend to Kensington resurfaced with more than 300 cars of cinder ballast.

New angle bars installed at all track joints, approximately 11,000 pairs being used.

All block and other signals rebuilt, including wiring and controls.

New telephone lines for company communication installed. Entire right-of-way cleared of undergrowth and weeds.

Portions of the rehabilitation work now under way are:

Rock ballasting of the section from Kensington to Hammond 60 per cent completed.

Steel trusses to support trolley wire on the above section in place. These trusses are mounted on the wooden poles.

Side tracks being extended and double-ended to take care of increase in freight business.

Freight stations enlarged and renewed.

Four new electric substations now under way and work is to start soon on a fifth.

New stations at Michigan City and South Bend in use and Gary and Tremont passenger stations being rebuilt.

Twenty-eight more passenger trains are being operated by the South Shore Line than at this time a year ago. Two of these are limited trains. The others are distributed between local and express service.

Table V—Electric Locomotives Ordered During 1925

Name of Railway	Number	Weight, Tons	Length Over All Ft. In.
New England States			
Aroostook Valley R.R.....	1	50	...
New York, New Haven & Hartford R.R.....	3	80	37-6
Eastern States			
Delaware, Lackawanna & Western R.R.....	1	50	29-0
New York Rapid Transit Corp.....	1	50	37-4
Pennsylvania R.R.....	24	75	....
Central States			
Chicago, South Shore & South Bend Ry.....	4	80	....
Great Northern R.R.....	4	177	...
Michigan Central R.R.....	2	120	42-2
St. Louis and Belleville El. Ry.....	1	80	40-0
Western States			
San Diego Electric Ry.....	1	50	40-0
Cuba			
Hershey Cuban Ry.....	3	60	37-4
Canada			
Montreal & Southern Counties Ry.....	1	50	...
Oshawa Ry.....	1	50	32-0
Total.....	47		

34 per Cent of Passenger Cars Are Over Twenty Years Old

Less than Half of All Cars Now in Electric Railway Service Were Purchased in the Last Fifteen Years—Greater Number of New Cars Are Needed to Modernize Industry than Was Anticipated—Nationwide Survey More than Confirms Previous Estimates

PURCHASE of more than 28,000 electric railway passenger cars is necessary in the near future if the industry is to be brought up to the high degree of efficiency necessary under present-day conditions. This is based only on replacement of those cars which are today twenty years of age or older. Many cars built in more recent periods may rightfully be considered obsolete equipment, so that an even greater number of new cars is needed to modernize fully electric railway rolling stock. This estimate would provide for replacement of obsolete cars only. It makes no provision for expansion of service which is known to be necessary in many localities if the patrons are to be given satisfactory accommodations.

Purchase of such a large quantity of equipment

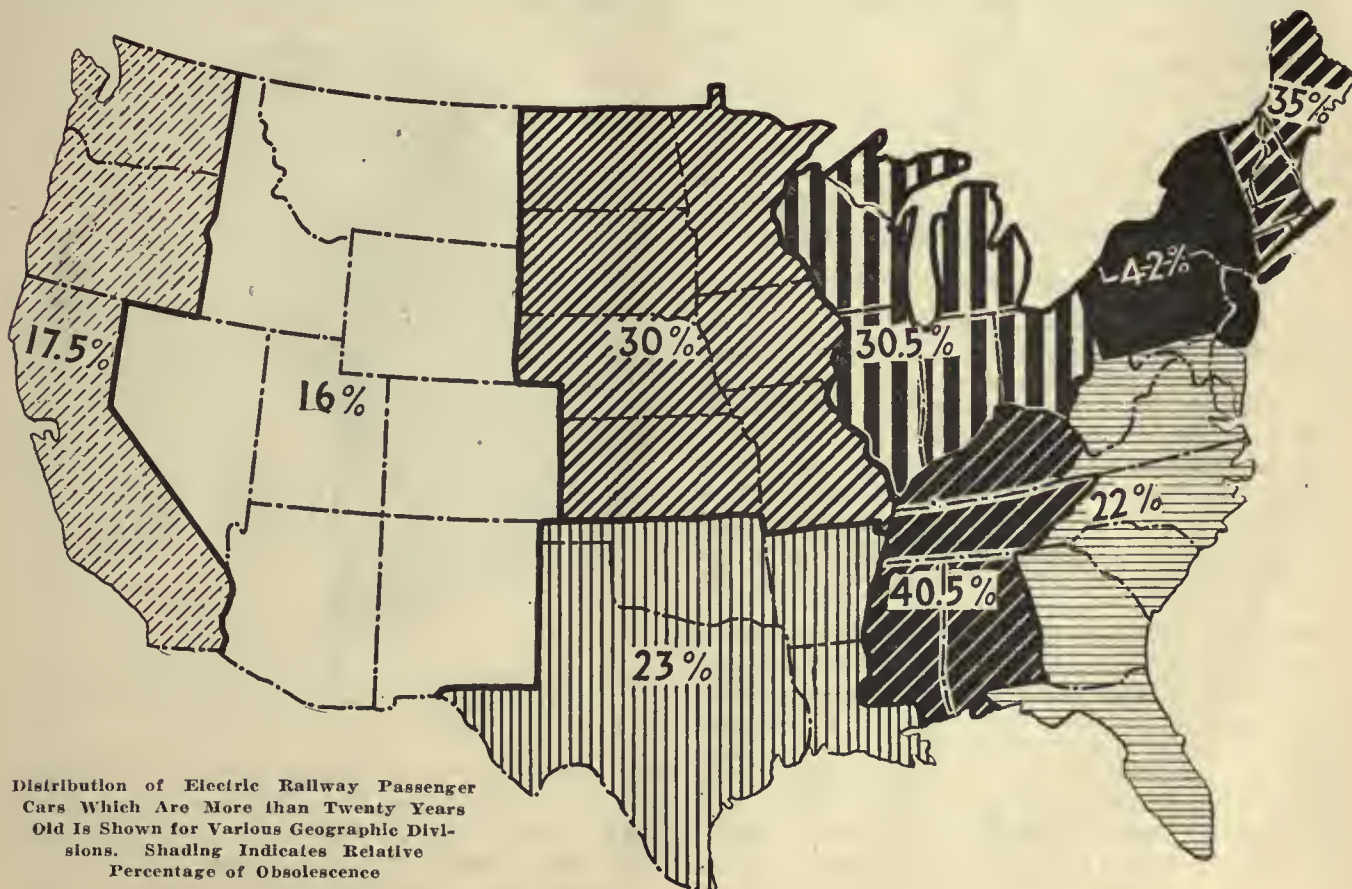
CLASSIFICATION OF ELECTRIC RAILWAY PASSENGER CARS BY AGE

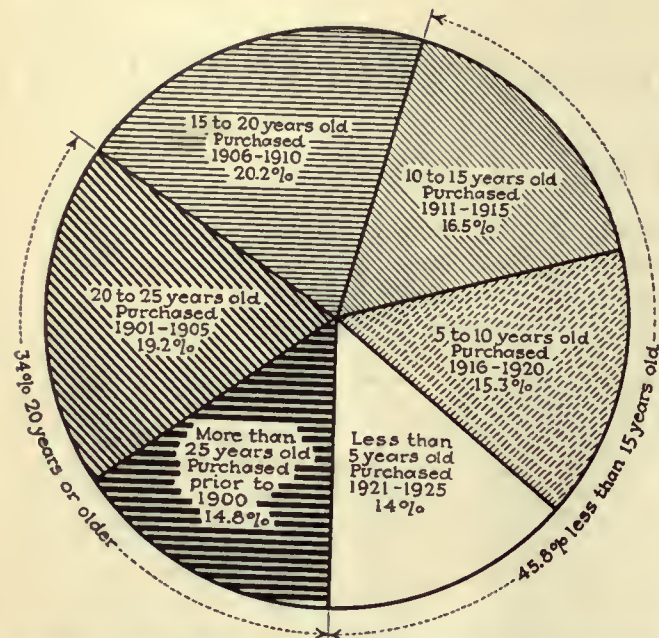
Age, Years	Number of Cars	Per Cent of Total
More than 25	11,740	14.2
20 to 25	16,345	19.8
15 to 20	16,945	20.5
10 to 15	13,740	16.8
5 to 10	12,440	15.1
Less than 5.....	11,240	13.6
	82,450	100.0

involves the expenditure of a very large amount of money. If the average cost of a car is \$10,000, which is undoubtedly low today, it means that \$280,000,000 will be required. While such a task appears herculean, it is vital if the industry is to keep pace. For if the program of replacement is put off, the problem of providing

new equipment of a character to attract patronage and win good will becomes cumulatively more difficult.

These statements are based on a survey made by this paper in the past few weeks, in which information has been obtained covering the industry in the entire United States. The results have more than confirmed previous estimates made by ELECTRIC RAILWAY JOURNAL, the American Electric Railway Association and others in position to analyze available statistics. The





Inventory of City Cars Shows 34 per Cent That Are Twenty Years or More Old. In Addition 20.2 per Cent Have Seen Fifteen to Twenty Years of Service

more complete information on which the new figures are based shows the problem to be even more serious than had been anticipated in the earlier studies. In these estimates two general methods of approach have been used. One had for its object a determination of the deficiency in annual replacements, assuming a twenty-year life as a basis. The other was worked out by subtracting the purchases of new equipment each year since 1907 from the total number of cars owned. In this latter estimate the object was to find the number of passenger cars which were purchased previous to the development of many of the improvements which are now included in modern cars. These estimates, based upon figures compiled by the United States Census Bureau and statistics published annually in *ELECTRIC RAILWAY JOURNAL*, have indicated that there are 25,000 obsolete electric railway cars in service. An article covering this subject was published in *ELECTRIC RAILWAY JOURNAL* for Nov. 14, 1925, page 853.

SURVEY COVERED ENTIRE COUNTRY

The more comprehensive analysis of the age of the equipment in various sections of the country has been obtained from a nation-wide survey published here for the first time. Questionnaires were sent to every electric railway property in the United States. The returns were supplemented by records compiled by the General Electric Company and the Westinghouse Electric & Manufacturing Company through personal contact of representatives of their division offices with the electric railway properties in various sections of the country.

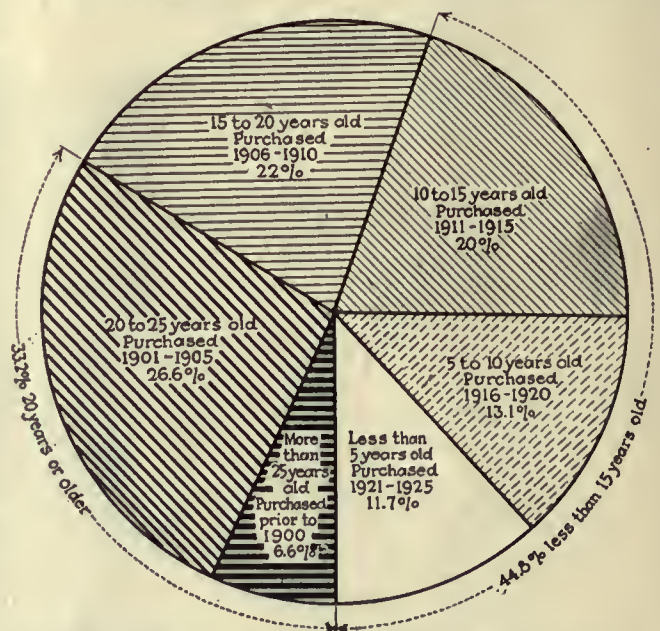
The importance of directing attention to the replacement of obsolete equipment is strikingly brought out. Information obtained shows that 34 per cent of the total number of passenger cars are more than twenty years old. There are at present 82,450 passenger cars in the United States. This figure was compiled by *ELECTRIC RAILWAY JOURNAL* a year ago and published in the issue of March 7, 1925, page 368. Similar figures are collected annually for the McGraw Electric Railway Directory. Applying the above proportion of 34 per

cent indicates that over 28,000 cars are more than twenty years old. Most of the major developments that are included in modern car design and construction have been made considerably inside of a twenty-year period. Consequently the number of cars which do not incorporate these developments is considerably above the figure given.

Further analysis of the age of cars by geographical districts and by class of service is shown in the table and on the accompanying map. It indicates the relative conditions in various parts of the country. In the Middle Atlantic States, comprising New York, New Jersey and Pennsylvania, it is seen that 42 per cent of the existing equipment is over twenty years old. In the East South Central States, comprising Kentucky, Tennessee, Alabama and Mississippi, 40.5 per cent of the equipment is shown to be more than twenty years old. The proportion ranges down through the remainder of the nine divisions into which the country is divided to 16 per cent for the Mountain States of Idaho, Colorado, Utah, Wyoming, New Mexico, Arizona, Nevada and Montana. It is of interest in passing to note that the sections which show the largest proportion of equipment over twenty years old correspond to those in which construction of electric railway lines progressed rapidly during the earlier years of the industry's history.

The per cents indicating total number of obsolete cars follow the condition of city rather than interurban equipment. This is primarily due to the greater number of city cars owned. In the table on page 27 are shown the per cents for both classes of service, divided between the various geographic sections. Here, it will be noted, the distribution of obsolete interurban cars varies considerably from the city distribution.

Returns from this survey have been compiled to show the relative age of passenger cars in five-year periods



Condition of Interurban Equipment Is Illustrated by This Diagram. the Largest Group of Cars Is from Twenty to Twenty-five Years Old

since 1900 and those purchased previous to that year. These have been further subdivided as between city and interurban cars. The results are shown graphically in the accompanying circle diagrams.

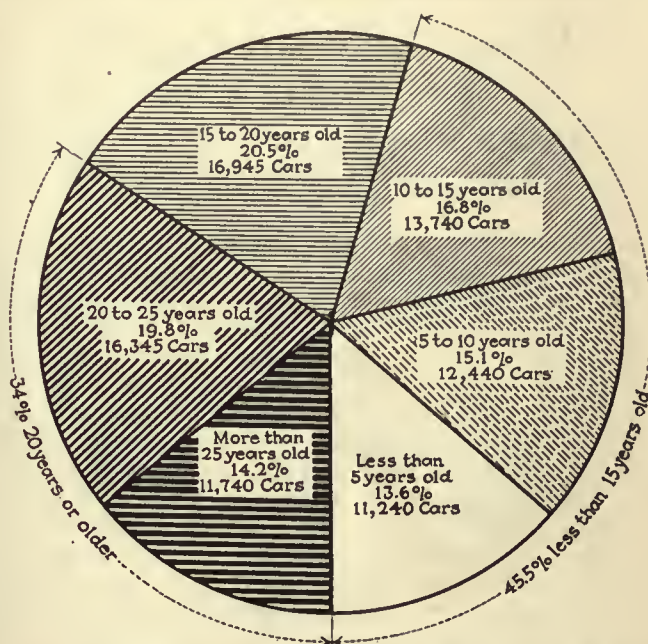
Under the city classification 14.8 per cent were pur-

chased prior to 1900. Thus they were found to be more than 25 years old; 19.2 per cent fall in the group having an age of between twenty and 25 years. This makes a total of 34 per cent that have been in service for twenty years or longer. There is a group comprising 20.2 per cent which are from fifteen to twenty years old. These would also probably fall into an obsolete classification on the basis of the developments which have been made in car construction since they were built.

Of the cars which may be classed as more nearly modern, 16.5 per cent are from ten to fifteen years old, 15.3 per cent are five to ten years old and 14 per cent are less than five years old. This makes a total of 45.8 per cent of the total number of city cars that have been purchased within fifteen years.

A similar division has been made of the interurban cars—6.6 per cent were purchased previous to 1900 and are more than 25 years old; 26.6 per cent are twenty to 25 years old; 22 per cent fall into the group from fifteen to twenty years. Of the cars that are less than fifteen years old 20 per cent are between ten and fifteen years, 13.1 per cent fall between five and ten years and 11.7 per cent were purchased within the last five years.

An interesting check is obtained on the estimates made in preparing the chart on page 854 of the Nov. 14 issue, in which the conclusion that there are 25,000 obsolete cars was derived. In compiling the earlier chart the assumption was made that all cars purchased since 1907 are still in service. It was pointed out at that time that a certain number of comparatively modern cars had been destroyed by fire, accident and other causes. No method of approximating this number was available at that time. The present survey gives a basis for comparison with the original estimate. The diagram for city and interurban cars combined shows that 45.5 per cent of the total number of cars have been purchased within the last fifteen years. This is equivalent to approximately 37,500 cars on the basis of last year's estimate of 82,450 cars. The total number of cars purchased during these last fifteen years, as shown in the tabulation in another article in this issue for cars purchased each year since 1907, amounts



Combined Interurban and City Cars Are Here Divided in Five-Year Periods. Cars Purchased Previous to 1900 Are Grouped Together. 34 per Cent of the Total Are at Least Twenty Years Old

to approximately 42,700. The difference of 5,200 cars represents those destroyed by fire, accident and other causes and those abandoned and not reported for various reasons.

Consideration of the combined diagram for both city and interurban cars gives a graphical presentation of the general condition of equipment. From this chart there are 14.2 per cent of the total number of passenger cars that are more than 25 years old. This amounts to 11,740 cars; 19.8 per cent fall in the group ranging from twenty to 25 years and aggregate 16,345 cars. Thus, the total of the combined city and interurban cars more than twenty years old amounts to 34 per cent, or 28,085. In addition there are 16,945 cars that are fifteen to twenty years old and amount to 20.5 per cent of the total. Unquestionably, most of the cars in this last group do not include modern developments in construction and design. Weight reduction, low floors, small wheels, higher grade materials and many other improvements have been introduced within comparatively recent years. Many developments have also been made in trucks, motors and control, air brakes, door controls and other items of equipment.

This analysis has been presented in considerable detail because of the importance of the subject from the standpoint of the future progress of the industry. It has been repeatedly pointed out that electric railway transportation has survived through a period of serious economic and operating handicaps. The condition of electric railway equipment today is in large measure attributable to the long series of events that have produced rising costs on the one hand and limited income on the other. But the industry today more clearly than ever before occupies a sound economic position as a fundamental necessity in modern community development. There has been a growing conviction that it is on the threshold of an era of renewed prosperity and usefulness. Attention to the subject of replacing obsolete equipment is shown by this analysis to be of paramount importance at this time.

Passenger Cars Over Twenty Years Old by Geographical Districts

Geographical District	Per Cent of Passenger Cars Over 20 Years Old		
	City	Interurban	Total
New England	29.1	62.6	35
(Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut)			
Middle Atlantic	42.6	36.1	42
(New York, New Jersey, Pennsylvania)			
East North Central	30.4	30	30.4
(Ohio, Indiana, Illinois, Michigan, Wisconsin)			
West North Central	23.2	46.8	30
(Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas)			
South Atlantic	20.6	42	22
(Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida)			
East South Central	40.8	34.5	40.5
(Kentucky, Tennessee, Alabama, Mississippi)			
West South Central	26.1	7.1	23
(Arkansas, Louisiana, Oklahoma, Texas)			
Mountain	17.1	3.8	16
(Idaho, Colorado, Utah, Wyoming, New Mexico, Arizona, Nevada, Montana)			
Pacific	17.1	23	17.5
(Washington, Oregon, California)			

Heavy Traction Progress in 1925

Many Projects Completed, both in This Country and
Abroad—Increasing Attention Being Paid to
Electric Operation on Trunk Lines

MORE progress in steam railroad electrification was made in 1925 than for any year since 1919. In fact, the track equipped for electric operation was 20 miles more than the entire electrifications in 1920 to 1925, inclusive. The work was done by five roads. The Virginian Railway easily stands at the head of the list. There the loads to be hauled are of the heaviest character. The entire installation has been done in a manner not only to replace the steam service, but to increase the capacity largely. That the result has been accomplished is shown in the article published in this paper on Oct. 3, following inauguration of the system between Mullins and Clarks Gap, W. Va. At that time completion of the system to Roanoke had been deferred, since a question had arisen regarding ownership and operation of the property. Since then the objections have been cleared away and it is considered probable that the project will be completed with the present year.

SEVERAL EXISTING SYSTEMS EXTENDED

The Norfolk & Western Railway also added materially to its electrified mileage during the year. The initial electrification of this road was completed some ten years ago. Since then the electrified mileage has been added to year by year, thus increasing the utility of the electrification. Both this road and the Virginian use the same electrical system, 11,000 volts, 25 cycles, single phase. As they operate in the same territory, carry the same class of freight and are financially connected the interchangeability of equipment is certain to be of great advantage.

Of an entirely different character is the electrification of the Staten Island Rapid Transit system. This road, which is a subsidiary of the Baltimore & Ohio Railroad, handles an extensive passenger business, largely to and from the ferries to Brooklyn and Manhattan. The installation has been planned so that in case the city of New York connects Staten Island with Brooklyn by means of a tunnel, the trains can be operated over the Brooklyn-Manhattan Transit Corporation's subway system. Accordingly the 600-volt direct-current system is used. Electrification of the Staten Island line already has made a marked improvement in transportation in the Borough of Richmond. Train speeds have been increased and more service is being operated than was feasible with locomotive-hauled steam trains.

The Long Island Railroad's 600-volt direct-current system was extended to Babylon during the year, a distance of 27 miles. This converts a large portion of the Montauk Division to electric operation. It has made possible the operation of through trains to New York, eliminating the transfer at Jamaica.

The New Haven Railroad inaugurated electric operation on the Danbury branch, a 25-mile line connecting South Norwalk on the main line with Danbury. The purpose of the electrification was largely to eliminate the facilities for handling steam locomotives at the ends of the line. Practically all operation on the New Haven system west of New Haven, both freight and passenger,

is now handled by electric locomotives and electric motor cars. The 11,000-volt, single-phase system which is used on the main line has been adopted.

Progress has been made on the Illinois Central electrification in Chicago, although it will not be in service for some months.

FOREIGN ELECTRIFICATIONS PROGRESSING

Many electrification plans are being pushed in Europe. The Austrian government has appropriated some \$18,000,000 for electrifying the Tyrolean Railroad between Salzburg and Brudenz. In Germany work is nearing completion on the Munich-Garmisch line. Financial credits have been secured for the conversion of the Munich-Rosenheim-Kufstein line. A number of other projects are planned for this year.

Progress in Switzerland has been rapid since it was decided about a year ago to accelerate the electrification program so that practically all the main lines of the Swiss Federal Railways will be electrified within the next two years.

The Midi Railway in southern France is carrying to completion an extensive program of electrification. About 300 miles are now in service, making it by far the most pretentious French electric railroad system at present operating.

The Southern Railway of England began operation on 100 miles of track out of a total of 250 that are being electrified. This is a suburban system operating a number of lines radiating out of London.

The Japanese Government Railways has begun an extensive program of electrification in order to increase the capacity of its lines. The first step in this is the equipment of the Tokio-Kobe line as far as Kozu, a distance of 50 miles.

The Paulista Railway in Brazil is extending 25 miles from Tatu to Rio Clara. The Mexican Railway electrification is being extended 17 miles over the Maltrate incline. Various other projects have been inaugurated during the year in foreign countries.

PROJECTS UNDER CONTEMPLATION

During the year the Pennsylvania Railroad announced that it will electrify its New York-Washington line. The first step in this will be the section from Philadelphia to Wilmington. The route is already electrified from Pennsylvania Station, New York, to Manhattan Transfer and from North Philadelphia to West Philadelphia. It will be necessary to standardize the contact system, as the former installation is at 600 volts direct current while the latter is at 11,000 volts, single phase, alternating current.

Lines of the New York Central on the west side of Manhattan Island must be electrified at once, according to the latest court decision. Though this improvement is desirable, so much is involved in the way of grade separation that it will undoubtedly be some time before the work can be undertaken.

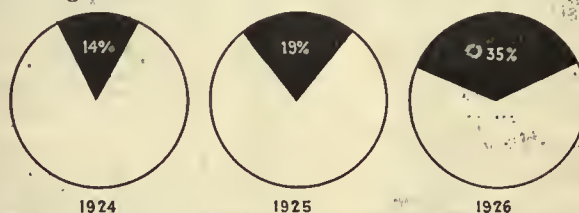
The status of electrification has been changed somewhat by the successful construction of oil-electric locomotives driven by Diesel engines. Several of these have been tried out during the year, and show great possibilities for handling traffic where there would not be sufficient density to justify installation of full electric equipment. This should simplify the electrification problem, particularly where there are many unimportant feeder lines to be considered.

Bus Operation by Electric Railways Broke All Records in 1925

More Companies Inaugurated Bus Service During the Past Twelvemonth than in Any Previous Year—The Number of Buses Operated More than Doubled—Purchases of New Passenger and Service Equipment Were Greater than Ever Before

PROGRESS made in bus operation by practically all the electric railways in the United States and Canada during the year just ended surpasses by a wide margin that of any previous twelve-month period. This is shown by statistics for 1925 compiled from information gathered from these companies by ELECTRIC RAILWAY JOURNAL. When statistics of bus operation by electric railways for 1924 were published in the Jan. 3, 1925, issue of this paper, showing that the number of companies furnishing such service had increased one-third during that year and that the number of buses owned had doubled, the rapidity of this development

seemed remarkable. During 1925, however, the expansion was at an even greater rate. Railway companies operating buses increased in number from 156 to 280,



Proportion of Electric Railways Operating Buses to Total Number of Companies at the First of Each Year

Automotive Service Equipment Ordered by Railways During 1925

Name of Railway	No.	Type of Chassis	Body Builder	Name of Railway	No.	Type of Chassis	Body Builder
Connecticut				Indiana			
Connecticut Co.....	6	1 Ton Truck	Ford	Beech Grove Trac. Co.....	1	1 Ton Truck	Ford
	1	1 Ton Truck	Dodge	Hammond, Whiting & East			
	2	1 Ton Truck	Ford	Chicago Ry.....	1	Tower Truck	White
	1	3 1/2 Ton Truck	White	Kentucky			
Maine				Louisville Ry.....	1	1 Ton Truck	Ford
York Utilities Co.....	1	Reo Speed Wagon	.....		1	2 Ton Tower Truck	Dodge-Graham
Massachusetts				Michigan			
Eastern Mass. St. Ry.....	3	1 Ton Truck	Ford	Dept. of St. Rys., Detroit.....	28	Service Truck	.....
	1	1 1/2 Ton Truck	Cadillac	Milwaukee Elec. Ry. & Lt. Co...	2	3 Ton Exp. Truck	Int. Harvester- (Stoughton)
Springfield St. Ry.....	1	2 Ton Truck	Federal		37	Truck	White-Sterling
District of Columbia				Minnesota			
Washington Ry. & Elec. Co....	8	Service Truck	.....	Duluth St. Ry. Co.....	1	2 Ton Tower Truck	White
New Jersey					1	1 1/2 Ton Dump Truck	White
Trenton & Mercer County Trac.	3	1 1/2 Ton Truck	Mack		1	1 Ton Truck	Ford
New York				Mesaba Ry. Co.....	1	Gas Tank Truck	White Chassis
Black River Trac. Co.....	1	Snow Plow	G. M. C.		1	1 1/2 Service Truck	Graham
Brooklyn City R.R.....	1	5 Ton Trans. Wrecker	White-Hoover	Twin City Rapid Transit Co....	3	1 Ton Trucks	Ford
	1	2 Ton Line Truck	Coml.	Missouri			
	3	2 Ton Line Truck	White-Trenton	United Rys. Co. of St. Louis....	2	2 1/2 Ton Truck	White-U.R. Co.
	3	3 1/2 Ton Line Truck	White-Trenton		1	1 Ton Truck	Ford
	2	2 Ton Track Truck	White-Hoover		1	1 Ton Truck	Ford
	3	3 1/2 Ton Track Truck	White-Hoover		1	5 Pass. Auto	.....
New York State Rys.....	1	1 Ton Truck	Ford	Ohio			
	2	3 1/2 Ton Truck	Brookway	Cleveland Ry.....	3	1/2 Ton Truck	White-Klein
	2	3 1/2 Ton Truck	Brookway	Southern Ohio Public Service Co.	1	5 Ton Truck	White
	3	1 1/2 Ton Truck	Brookway	Florida			
Schenectady Ry.....	1	2 1/2 Ton Truck	Mack	Jacksonville Trac. Co.....	1	1 1/2 Ton Truck	Int. Harvester Co.
	1	5 Ton Universal Crane	.....	Georgia			
		Mounted on Mack	.....	Athens Ry. & Elec. Co.....	1	1 Ton Truck	Ford
United Trac. Co.....	2	5 1/2 Ton Snow Plow	Walter		1	1 Ton Truck	Ford
	1	2 Ton Truck	Ford	Columbus Elec. & Pwr. Co.....	1	1 Ton Truck	.....
Pennsylvania				Georgia Ry. & Pwr. Co.....	18	3 1/2 Ton Truck	.....
Buffalo & Erie Ry.....	2	6 Ton Truck	White	Tennessee			
Philadelphia Rapid Transit Co..	6	1 Ton Truck	Ford	Jackson Ry. & Lt. Co.....	2	Service Truck	.....
	8	2 1/2 Ton Truck	Mack	California			
	1	Roadster	Ford	Los Angeles Ry. Corp.....	10	Truck	.....
	1	1 Ton Truck	Ford	Municipal Ry., San Francisco...	1	Truck	Reo
	1	5 Ton Truck	G. M. C.	Kansas			
	3	2 1/2 Ton Truck	G. M. C.	United Trac. System.....	2	2 Ton Truck	Reo
Pittsburgh Rys.....	2	2 1/2 Ton Trailer	P. R. T.	Texas			
	4	5 Ton Tower Truck	Mack	Dallas Ry. Co.....	1	2 Ton Truck	White
	5	5 Ton Snow Plow	Walter		1	Truck	Ford
West Penn Rys.....	1	5 Ton Universal Crane	Mack	Wichita Falls Trac. Co.....	1	Truck	Dodge
	1	3 1/2 Ton Tower Truck	White	Washington			
West Virginia				Grays Harbor Ry. & Lt. Co....	3	5 Ton Dump Truck	.....
Norfolk & Western Ry.....	1	5 Ton Truck	White		1	5 Ton G. M. C.	.....
	1	3 Ton Truck	International		2	White	.....
	1	2 Ton Truck	White	Seattle Munic. Ry.....	1	3 1/2 Ton Truck	G. M. C.
	1	Speedwagon	Reo		2	1 Ton Truck	Ford
Illinois				Canada			
Aurora Pl. Infield & Joliet Ry....	1	2 Ton Truck	Pierce Arrow	B. C. Elec. Ry. Co. Ltd.....	2	4 Ton Dirt Truck	Leyland-Co. Shop
Chicago & Joliet Elec. Ry.....	1	Tractor	Fordson		2	3 Ton Dirt Truck	Leyland-Co. Shop
Chicago North Shore & Milwaukee	2	5 Ton Tractor	White		2	2 1/2 Ton Truck	Federal-Co. Shop
R.R.....	1	2 1/2 Ton Truck	White		1	1 Ton Truck	Federal-Co. Shop
Chicago Rapid Transit Co.....	2	1 Ton Truck	Ford	Niagara, St. Catharines & Toronto			
	1	1 Ton Truck	Yellow Coach	Ry.....	1	2 1/2 Ton Truck	Leyland
Chicago Surface Lines.....	2	5 Ton Trucks	White-Press Sons	Ottawa Elec. Rys. Co.....	1	2 Ton Truck	Federal
	1	3 Ton Truck	Auto Car-Voltz		1	Tower Truck (Rep.)	Local
			Bros.	Quebec Ry. Lt. & Pwr. Co.....	1	Gas-Elec. Snow Plow	Cummings
	10	3 Ton Truck	White-C. S. L.	Winnipeg Elec. Co.....			
East St. Louis Ry.....	1	2 1/2 Ton Truck	Mack-Press Sons				
	1	1 Ton Truck	Dodge-Graham				
	1	Tower	.....				
Illinois Traction, Inc.....	22	1 Ton Truck	Ford				
				Total.....		284	

Bus Operation by Electric Railways and Subsidiary Companies

Connecticut		West Virginia		Georgia	
Connecticut Co.	103	Charleston Interurban R.R.	3	Augusta-Aiken Ry. & Electric Corporation	1
Danbury & Bethel St. Ry.	4	Monongahela West Penn Public Service Co.	9	Columbus Electric & Power Co.	16
Groton & Stonington St. Ry.	3	Ohio Valley Electric Ry.	9	*Fairburn & Atlanta Ry. & Electric Co.	4
Hartford & Springfield St. Ry.	21	Princeton Power Co.	1	Georgia Ry. & Power Co.	15
*Lordship Ry.	4	Wheeling Public Service Co.	4	Savannah Electric & Power Co.	2
New Haven & Shore Line Ry.	10	Wheeling Traction Co.	2		
Waterbury & Milldale Tramway	3				
Maine		Illinois		Louisiana	
Central Maine Power Co.	1	Aurora, Elgin & Fox River Electric Co.	3	Baton Rouge Electric Co.	3
York Utilities Co.	6	Central Illinois Public Service Co.	5	New Orleans Public Service, Inc.	19
Massachusetts		Chicago & Joliet Electric Ry.	8	Mississippi	
Boston Elevated Ry.	156	Chicago, North Shore, & Milwaukee R.R.	46	*Meridian Light & Ry. Co.	10
Boston & Worcester St. Ry.	7	Chicago & West Towns Ry.	17	Mississippi Power & Light Co.	1
Eastern Massachusetts St. Ry.	59	East St. Louis Ry.	11		
Fitchburg & Leominster St. Ry.	3	Evanston Ry.	6	North Carolina	
Gardner-Templeton St. Ry.	1	Illinois Power Co.	8	Asheville Power & Light Co.	2
Holyoke St. Ry.	3	Illinois Power & Light Corp. (Bloomington)	9	Carolina Power & Light Co.	3
Interstate St. Ry.	6	Illinois Power & Light Corp. (Champaign)	9	Durham Public Service Co.	11
Middlesex & Boston St. Ry.	33	Illinois Power & Light Corp. (Danville)	4	Southern Public Utilities Co.	2
New Bedford & Onset St. Ry.	5	Illinois Power & Light Corp. (Decatur)	15	Tidewater Power Co.	3
Plymouth & Brockton St. Ry.	1	Illinois Power & Light Corp. (Galesburg)	7	South Carolina	
Springfield St. Ry.	25	Illinois Power & Light Corp. (Peoria)	9	South Carolina Gas & Electric Co.	14
Union St. Ry.	10	Illinois Power & Light Corp. (Quincy)	8		
Worcester Consolidated St. Ry.	12	Illinois Traction System (Valley Division)	2	Tennessee	
New Hampshire		Illinois Traction System (Main Line Division)	2	Nashville Interurban Ry.	1
*Laconia St. Ry.	4	*Joliet, Plainfield & Aurora Transp. Co.	5	Tennessee Electric Power Co.	5
*Portsmouth Electric Ry.	8	Rockford City Traction Co.	3	Union Traction Co.	1
Nashua St. Ry.	3	Rockford & Interurban Ry.	6		
Rhode Island		Tri-City Ry. of Illinois	2	Arizona	
Newport Electric Corporation	19			Tucson Rapid Transit Co.	5
*Newport & Providence Ry.	58	Indiana		California	
United Electric Rys.	3	Chicago, South Bend & Northern Indiana Ry.	19	Bakersfield & Kern Electric Ry.	5
Vermont		Gary Rys.	68	Eureka St. Ry.	1
*Twin State Gas & Electric Co.	3	Indianapolis & Cincinnati Traction Co.	29	Key System Transit Co.	27
Delaware		Indianapolis St. Ry.	5	Los Angeles Ry.	149
Wilmington & Philadelphia Traction Co.	45	Indiana Service Co.	5	Market St. Ry.	13
District of Columbia		Interstate Public Service Co.	41	Municipal Ry. of San Francisco	145
Capital Traction Co.	26	Northern Indiana Power Co.	2	Pacific Electric Ry.	7
Washington Ry. & Electric Co.	44	Southern Indiana Gas & Electric Co.	6	Pacific Gas & Electric Co.	7
Washington & Old Dominion Ry.	11	Terre Haute, Indianapolis & Eastern Trac. Co.	10	Peninsular Ry.	7
Washington-Virginia Ry.	11	Union Traction Co.	17	San Diego Electric Ry.	12
Maryland				San Francisco-Sacramento R.R.	1
Cumberland & Westernport Electric Ry.	3	Iowa		San Jose R.Rs.	5
Potomac Edison Co.	50	Des Moines City Ry.	3	Santa Barbara & Suburban Ry.	3
United Rys. & Electric Co.	81	Des Moines & Central Iowa R.R.	3	Stockton Electric Ry.	3
New Jersey		Dubuque Electric Co.	7	Union Traction Co.	3
Coast Cities Railway	25	Fort Dodge Des Moines & Southern R.R.	15	Colorado	
Cumberland Traction Co.	2	Iowa Southern Utilities Co. (Burlington)	4	Denver & Interurban R.R.	4
Millville Traction Co.	7	Iowa Southern Utilities Co. (Centerville)	3	Denver Tramway	3
Morris County Traction Co.	4	Mississippi Valley Electric Co.	5	Idaho	
New Jersey Inter-Urban Co.	4	Tama & Toledo R.R.	4	Boise Street Car Co.	2
Ocean City Electric Railroad	1	Waterloo, Cedar Falls & Northern Ry.	9	Kansas	
Public Service Ry.	809	Kentucky		Arkansas Valley Interurban Ry.	3
Trenton & Mercer County Traction Corporation	27	Kentucky Traction & Terminal Co.	7	Kansas Electric Power Co.	6
New York		Louisville Ry.	17	Kansas City, Leavenworth & Western Ry.	11
Auburn & Syracuse Electric R.R.	4	Michigan		Topeka Ry.	1
Binghamton Ry.	3	City of Detroit—Dept. of St. Rys.	161	*Salina St. Ry.	2
Black River Traction Co.	15	Detroit United Ry.	180	United Power & Light Corporation	2
Brooklyn-Manhattan Transit Corporation	10	Grand Rapids Ry.	14	Wichita R.R. & Light Co.	13
Empire State Railroad	6	Michigan R.R.	32	Nebraska	
Geneva, Seneca Falls & Auburn R.R.	3	Michigan Electric Ry.	2	Lincoln Traction Co.	1
International Ry.	34	Muskegon Traction & Lighting Co.	2	Omaha & Council Bluffs St. Ry.	5
Jamestown St. Ry.	12	Saginaw Transit Co.	28	New Mexico	
*Newburgh Public Service Co.	22	Minnesota		City Electric Co.	1
New York Rys.	36	Duluth St. Ry.	8	Oklahoma	
New York State Rys. (Rochester)	15	Mesaaba Ry.	9	Northeast Oklahoma R.R.	5
New York State Rys. (Syracuse)	7	Twin City Rapid Transit Co.	91	*Oklmulgee Traction Co.	3
New York State Rys. (Utica)	7	Missouri		Oklahoma Ry.	26
Niagara Gorge R.R.	5	Kansas City, Clay County & St. Joseph Ry.	16	Oklahoma Union Ry.	14
Olean, Bradford & Salamanca Ry.	1	Kansas City Ry.	69	Tulsa St. Ry.	14
*Port Jervis Transit Co.	2	Missouri Power & Light Co.	17	Oregon	
Rochester & Syracuse R.R.	1	Springfield Traction Co.	6	Portland Electric Power Co.	22
Syracuse & Eastern R.R.	1	St. Louis Electric Terminal Ry.	6	Southern Pacific System (Salem)	3
Third Avenue Ry. System	8	United Rys. of St. Louis	40	South Dakota	
United Traction Co. of Albany	28	*West Missouri Power Co.	2	Sioux Falls Traction System	14
*Walkill Transit Co.	7	Ohio		Texas	
Pennsylvania		Cincinnati, Lawrenceburg & Aurora El. St. Ry.	4	Abilene Traction Co.	2
Altoona & Logan Valley Electric Ry.	11	City of Ashtabula—Division of St. Rys.	3	Eastern Texas Electric Co.	2
Beaver Valley Traction Co.	8	Cleveland Ry.	101	Houston Electric Co.	23
Chambersburg & Shippensburg Ry.	2	Columbus, Urbana & Western Electric Ry.	4	Marshall Traction Co.	1
Citizens Traction Co.	12	Community Traction Co.	3	*Nueces Ry.	5
Conestoga Traction Co.	2	Dayton, Springfield, & Xenia Southern Ry.	2	Rio Grande Valley Traction Co.	2
Erie Ry.	1	Indiana, Columbus & Eastern Traction Co.	36	San Antonio Public Service Co.	30
Johnstown & Somerset Ry.	4	Northern Ohio Traction & Light Co.	150	Texas Electric Ry.	6
Johnstown Traction Co.	9	Ohio Service Co.	5	Wichita Falls Traction Co.	2
Lackawanna & Wyoming Valley R.R.	2	Penn.-Ohio Electric Co.	44	Utah	
Lewiston & Reedsville Electric Ry.	10	Southern Ohio Public Service Co.	46	Utah-Idaho Central R.R.	2
Lehigh Traction Co.	5	Springfield Ry.	1	Utah Light & Traction Co.	1
Lehigh Valley Transit Co.	2	*Stark Electric R.R.	6	Washington	
Northumberland County Ry.	5	Staubenville, East Liverpool & Beaver Valley Traction Co.	2	Grays Harbor Ry. & Light Co.	3
Philadelphia & Westchester Traction Co.	3	Youngstown & Ohio River R.R.	4	Lewiston-Clarkston Transit Co.	1
Philadelphia & Western Ry.	2	Youngstown & Suburban Ry.	17	Pacific Northwest Traction Co.	28
Philadelphia Rapid Transit Co.	219	Youngstown Municipal Ry.	41	Puget Sound Electric Ry.	16
Pittsburgh Harmony Butler & New Castle Ry.	8	Wisconsin		Puget Sound International Ry. & Power Co.	35
Pittsburgh, Mars & Butler Ry.	22	Madison Rys.	6	Seattle Municipal Ry.	24
Pittsburgh Transit & Light Co.	3	Milwaukee Electric Ry. & Light Co.	121	Seattle & Rainier Valley Ry.	2
Schenck Ry.	8	Wisconsin Gas & Electric Co.	44	Canada	
Schenck Ry.	8	Wisconsin Power & Light Co.	3	British Columbia Electric Ry.	20
Seranton Ry.	4	Wisconsin Public Service Corporation	12	Grand River Ry.	3
Westmoreland County Ry.	5	Wisconsin Valley Electric Co.	12	Hydro-Electric Rys.	1
Westside Electric St. Ry.	2			London St. Ry.	1
Wilkes-Barre Ry.	14	Alabama		Montreal Tramways	26
*Williamsport Passenger Ry.	3	Birmingham Electric Co.	4	Nova Scotia Tramways & Power Co.	7
York Rys.	5	*Selma Electric Rys.	3	Ottawa Electric Ry.	9
West Chester St. Ry.	33	Arkansas		Quebec Ry., Light & Power Co.	40
Virginia		Arkansas Central Power Co.	9	Toronto Transportation Commission	2
Newport News & Hampton Ry. Gas & Elec. Co.	5	Hot Springs St. Ry.	6	Windsor, Essex & Lake Shore Rapids Rys.	2
Roanoke Ry. & Electric Co.	5	Intercity Terminal Ry.	2	Winnipeg Electric Ry.	22
Virginia Electric & Power Co.	124	Florida		Panama	
		Key West Electric Co.	4	Panama Electric Co.	2
		Tampa Electric Co.	22	Porto Rico	
				Ponce Electric Co.	3
				Hawaiian Islands	
				Honolulu Rapid Transit Co.	6

* Denotes company which operates buses only.

a gain of 124, or approximately 80 per cent. Of this number about twenty small properties have entirely, or almost entirely, given up their rail service and operate only buses.

An increase occurred in the number of buses owned from 2,462 to 5,358, a gain of 2,896, or 117 per cent. Orders for new equipment placed in 1925 were more than twice those of the year before.

Looking back to the figures published in the statistical issues of this paper for 1924, it will be seen that the number of bus operating companies was 121, and the number of buses slightly more than 1,200. The next year the number of companies was 156, an increase of 29 per cent, and the number of buses was 2,462, an increase of 105 per cent. Figures for 1925 given in the preceding paragraph show a considerably larger increase, and thus break all records. The proportion of electric railways operating buses to the total number of companies is shown graphically in an accompanying chart.

While the figures show that approximately 35 per cent of the railways have undertaken bus operation, the actual number of automotive vehicles is small in comparison to the number of electric railway cars, there being only some 5,000 of the former as against 82,000 of the latter, or about 6 per cent. It is estimated that passengers carried annually by electric railway buses number approximately 800,000,000, while those carried by the rail lines are about 16,000,000,000.

Route mileage of bus lines compares favorably with that of the car lines. Bus routes total approximately 13,000 miles, as against 46,000 miles of electric railway single track. A considerable part of the railway mileage, however, is double track, so that the total mileage of rail route is less than the total single-track mileage. The difference between the ratio of the number of vehicles, which is 16 to 1, and the ratio of the number of miles of route, which is about 2½ to 1, is accounted for by the fact that buses are more often used on light traffic lines in outlying sections, where the service is infrequent, than on heavy urban lines, where the number of vehicles per mile of track is large. These comparisons are graphically shown in accompanying charts.

It is interesting to note that a large portion of the 13,000 miles of bus route represents new service given by the railways, compared to which the

Buses Ordered by Railways During 1925

Name of Company	Total	No. of Each Type	Type of Chassis	Body Builder	Seating Capacity
Connecticut					
Connecticut Company.....	35	2	Mack	Mack	29
		4	Mack	Kuhlman	29
		3	White	Kuhlman	29
		2	White	Hoover	29
		24	Yellow Coach	Yellow Coach	29
Hartford & Springfield St. Ry.....	7	3	Mack	Mack	29
		2	Yellow Coach	Patterson	25
		2	Graham	Patterson	16
Waterbury & Milldale Tramway.....	3	1	White	Kuhlman	24
		1	White	Kuhlman	25
		1	White	Kuhlman	29
Maine					
Central Maine Power Co.....	1	1	White	.....	25
York Utilities Co.....	2	2	G. M. C.	Wishbach	21
Massachusetts					
Boston Elevated Railway.....	92	19	White	Brown	25
		11	White	Brown	29
		9	Mack	Mack	25
		22	Mack	Mack	29
		18	International	Niagara	25
		4	Yellow Coach	Yellow Coach	29
		1	Fageol	Fageol	29
		8	Miscellaneous	.....	29
Boston & Worcester St. Ry.....	7	7	Mack	Mack	29
Eastern Mass. St. Ry.....	16	5	Fageol	Fageol	31
		4	Fageol	Fageol	29
		6	Int. Harvester	Int. Harvester	29
		1	White	Brown	29
Gardner-Templeton St. Ry.....	1	1	Dodge	Graham	20
Middlesex & Boston St. Ry.....	21	21	White	Bender	29
New Bedford & Onset St. Ry.....	1	1	Reo	Boston Body Co	21
Plymouth & Brockton St. Ry.....	1	1	Reo	Boston Body Co	20
Springfield St. Ry.....	16	1	Federal	Brown	25
		3	Garford	Wason	21
		1	Garford	Garford	25
		8	Yellow Coach	Yellow Coach	29
		3	Yellow Coach	Yellow Coach	21
Union Street Railway.....	7	2	Mack	Mack	21
		1	Pierce Arrow	Brown	18
		3	Pierce Arrow	Brown	26
		1	Pierce Arrow	Brown	29
Worcester Consolidated St. Ry.....	12	2	White	Brown	25
		1	Pierce	Brown	29
		2	Mack	Mack	29
		4	Yellow Coach	Yellow Coach	29
		3	Yellow Coach	Yellow Coach	25
New Hampshire					
Laconia St. Ry.....	4	4	Reo	Boston Body Co	21
Portsmouth Electric Ry.....	8	8	White	Brown	29
Rhode Island					
Newport Electric Corp.....	11	5	Fageol	Fageol Parlor Car	29
		2	Fageol	Fageol Delux St. Car	29
		4	Fageol	Fageol St. Car	29
Newport & Providence Ry.....	6	.....	.....	.....	.....
United Electric Rys.....	12	2	Yellow Coach	Yellow Coach	29
		1	White	Brown	29
		5	Reo	Fitzjohn	21
		4	Yellow Coach	Yellow Coach	29
District of Columbia					
Capital Traction Co.....	15	8	Yellow Coach	Yellow Coach	21
		2	Yellow Coach	Yellow Coach	21
		3	Reo	Reo	16
		2	Reo	.....	21
Washington Ry. & Elec. Co.....	24	7	Graham	Hoover	20
		7	Six Wheel Co	Am. M. B. Corp.	27
		6	Yellow Coach	Yellow Coach	27
		2	Yellow Coach	Yellow Coach	29
		2	Yellow Coach	Yellow Coach	21
Washington & Old Dominion Ry.....	1	1	Graham	Graham	21
Washington-Virginia Ry.....	9	9	Fageol	Fageol	29
Maryland					
Cumberland & Westernport Elec. Ry.	3	3	White	Hoover	21
United Ry. & Elec. Co.....	9	6*	5th Ave	5th Ave	55
		2	Yellow Coach	Yellow Coach	29
		1	Yellow Coach	Yellow Coach	23
New Jersey					
Morris County Traction Co.....	3	2	G. M. C.	.....	14
		1	Reo	.....	30
Ocean City Elec. R.R.....	1	1	Reo	Reo	15
Public Service Railway.....	483	333	Gas-electric	Yellow Coach	29
		68	White	.....	29
		44	Mack	.....	25
		3	Fageol	.....	29
		3	Yellow Coach	.....	29
		32	Miscellaneous	.....	29
Trenton & Mercer County Traction Co.	8	6	Fageol	Fageol	29
		2	Mack	Mack	29
New York					
Auburn Syracuse Elec. Ry.....	4	4	Dodge	Graham	21
Black River Traction Co.....	3	3	G. M. C.	Railway Shops	16
Empire State R.R.....	6	6	Dodge	Graham	21
New York State Rys. (Rochester) ...	12	1	White	Bender	22
		1	White	Brown	29
		8	White	Bender	29
		1	Mack	Mack	25
		1	Studebaker	Autobody	21
New York State Rys. (Syracuse)	8	4	Brockway	Bender	25
		3	White	Bender	25
		1	Mack	Bender	25
New York State Rys. (Utica)	5	1	Mack	Bender	25
		1	Mack	Bender	25
		2	White	Bender	25
		1	Reo	Reo	21
Olean, Bradford & Salamanca Ry....	1	1	Clydesdale	Miller	16
Rochester & Syracuse R.R.....	1	1	Larabee	Whitfield	14
Syracuse & Eastern R.R.....	1	1	Reo	Patterson	25
United Traction Co.....	21	18	Fageol	Fageol	29
		3	Mack	Mack	25

mileage of rail route entirely replaced by bus lines is small. During 1925 extensions to bus routes operated by electric railways totaled about 3,500 miles. Of this less than one-tenth represented replacement of car service. City bus routes gained about 900 miles. New intercity routes totaled some 2,400 miles, while touring and sightseeing lines added another 140 miles. On the other hand, operation of about 12 miles of city bus route was abandoned by the railways and nearly 150 miles of interurban route.

Details of the developments during the year have been published in this paper from time to time and can only be summarized briefly here. Electric railways which added more than 200 buses during the year are the Public Service Railway, Newark, N. J., and the Philadelphia Rapid Transit Company. How the development of coordinated transportation in New Jersey has resulted in the former company becoming the largest bus operator in the United States was told in the issue of this paper for Nov. 28. Gas-electric bus operation inaugurated during the early part of the year by the Philadelphia Rapid Transit Company has been discussed widely and is being observed with interest by the industry.

One of the largest increases in 1925 in the number of buses owned by an electric railway occurred in Michigan, where the Detroit United Railways acquired 180 such vehicles. For the purpose of carrying its interurban passengers downtown from transfer stations on the outskirts of the city, this railway bought 40 single-deck Yellow coaches. An article on this subject was published in *ELECTRIC RAILWAY JOURNAL* for May 2, 1925. Purchase of competing independent bus lines was largely responsible for the remainder of the 180 buses acquired by the D. U. R.

In Norfolk, the Virginia Electric & Power Company, formerly the Virginia Railway & Power Company, purchased 102 competing buses and 22 new vehicles, making a total of 124. The Cleveland Railway has ordered more than 100 new buses. At present not all of these have been delivered and the full service has not been established. Ninety-two buses were added to the fleet operated by the Boston Elevated Railway. The Northern Ohio Traction & Light Company has greatly extended its bus service in the Akron and Canton districts, practically doubling the number of such vehicles in service. One of the pio-

Buses Ordered by Railways During 1925—(Continued)

Name of Company	Total	No. of Each Type	Type of Chassis	Body Builder	Seating Capacity
Pennsylvania					
Beaver Valley Traction Co.....	2	1	Pierce Arrow	Thompson	25
Chambersburg & Shippensburg Ry....	2	1	Mack	Mack	25
Citizens Traction Co.....	4	2	Garford	Garford	17
Erie Railways.....	4	4	Fageol	Fageol	29
Lehigh Traction Co.....	10	10	Yellow Coach	Yellow Coach	29
Lehigh Valley Transit Co.....	5	5	Mack	Mack	25
Pittsburgh, Harmony, Butler & New Castle Ry.....	3	1	Reo	Reo	21
Schuylkill Ry.....	4	2	Reo	Reo	17
Seranton Ry.....	2	2	Dodge	Paterson	18
Westmoreland County Ry.....	3	1	Fageol	Graham	20
		1	Garford		29
		1	Dodge		15
Westside Electric St. Ry.....	2	2	Mack	Mack	25
Virginia					
Roanoke Ry. & Elec. Co.....	3	3	Dodge	Graham	17
Virginia Elec. & Power Co.....	22	7	Reo	Reo	21
		5	White	Bender	23
		10	Mack	Amco	27
West Virginia					
Charleston Interurban R.R.....	3	3	Menominee	Thompson	25
Ohio Valley Elec. Ry.....	7	3	Graham		17
		4	Graham		21
Monongahela-West Penn Pub. Serv. Co.	2	1	Fageol	Fageol	22
		1	Yellow Coach	Yellow Coach	29
Wheeling Traction Co.....	2	2	Fageol		21
Illinois					
Aurora Elgin & Fox River Elec. Co...	3	2	White	Schaefer	25
		1	Fageol	Fageol	30
Central Illinois Pub. Serv. Co.....	5	2	Dodge	Graham	17
		3	Reo	Reo	21
Chicago & Joliet Elec. Ry.....	6	4	Mack	Mack	21 to 25
		2	Graham	Graham	21 to 25
Chicago, No. Shore & Milwaukee R.R.	6	2	Fageol	Fageol	22
		3	Studebaker	Studebaker	18
		1	Pierce Arrow	Bender	16
Chicago & West Towns Ry.....	10	10	Reo	Cunningham	21
East St. Louis Ry.....	6	3	Mack	St. Louis Car	29
		1	Mack	Mack	29
		1	Yellow Coach	St. Louis Car	29
		1	Yellow Coach	Yellow Coach	29
Illinois Power Co.....	3	3			29
Illinois Pwr. & Lt. Corp. (Bloomington)	6	6	Mack	Mack	25
Illinois Pwr. & Lt. Corp. (Champaign) ..	9	3	Yellow Coach	Yellow Coach	29
		6	White	White	25
Illinois Pwr. & Lt. Corp. (Danville) ...	4	4	Yellow Coach	Yellow Coach	29
Illinois Pwr. & Lt. Corp. (Galesburg) ...	7	5	Yellow Coach	Yellow Coach	29
		2	Yellow Coach	Yellow Coach	21
Illinois Pwr. & Lt. Corp. (Peoria)	9	8	Yellow Coach	Yellow Coach	29
		1	International		29
Illinois Pwr. & Lt. Corp. (Quincy)...	8	8	White		25
Illinois Traction System (Main Line)...	2	2	Yellow Coach	Yellow Coach	21
Illinois Traction System (Valley Div.)...	1	1	International		25
Joliet Plainfield & Aurora Transp. Co.	1	1	Pierce Arrow		30
Rockford City Traction Co.....	3	3	Yellow Coach	Yellow Coach	29
Indiana					
Chicago South Bend & Northern Indiana Ry.....	6	6	Reo	Fitzjohn	21
Gary Ry.....	45	13	Yellow Coach	Yellow Coach	29
		9	Yellow Coach	Yellow Coach	21
		13	Int. Harvester	Lang	24
		2	Int. Harvester	Lang	21
		8	Int. Harvester	Int. Harvester	12
Indianapolis & Cincinnati Traction Co.	4	4	Fageol	Fageol	31
Indianapolis St. Ry.....	24	24	Yellow Coach	Yellow Coach	29
Indiana Service Corp.....	5	5	Int. Harvester	Int. Harvester	29
Interstate Pub. Serv. Co.....	8	2	Studebaker		19
		4	Fageol		22
		2	Reo		20
Northern Indiana Power Co.....	2	2	Int. Harvester	Int. Harvester	12
Southern Indiana Gas & Elec. Co.....	6	6	Dodge	Graham	21
Terre Haute, Indianapolis & Eastern..	10	5	Yellow Coach	Yellow Coach	29
		5	Reo	Reo	21
Union Traction Co.....	10	5	Reo	Fitzjohn	21
		5	White	Kuhlman	25
Iowa					
Dubuque Electric Co.....	4	4	Mack	Mack	25
Iowa Southern Utilities Co. (Burlington)	4	4	Mack	Mack	25
Iowa Southern Utilities Co. (Centerville)	3	3	Graham	Graham	21
Waterloo, Cedar Falls & Northern Ry.	2	2	Mack	Mack	29
Kentucky					
Kentucky Traction & Terminal Co...	5	5	White	Kuhlman	25
Louisville Ry.....	5	4	Yellow Coach		29
		1	White	Bender	25
Michigan					
City of Detroit, Dept. of St. Rys....	135	123	Dodge	Graham	21
		12	Reo	Reo	29
Detroit United Ry.....	40	40	Yellow Coach	Yellow Coach	29
Grand Rapids Ry.....	2	2	Yellow Coach	Yellow Coach	21
Michigan R.R.....	14	14	Fageol	Fageol	26
Michigan Elec. Ry.....	12	12	Fageol	Fageol	26
Minnesota					
Duluth St. Ry.....	4	2	White	Eckland	...
		2	Mack	Eckland	...
Meaaba Ry.....	9	3	Mack	Eckland	20
		3	White	Eckland	20
		3	Fageol		29
Twin City Rapid Transit Co.....	8	7	Mack	Eckland	...
		1	Mack	Lang	...
Missouri					
Kansas City, Clay County and St. Joseph Ry.....	5	1	Yellow Coach	Yellow Coach	29
		3	Yellow Coach	Yellow Coach	18
		1	Studebaker		18
Kansas City Rys.....	67	2	Mack	Mack	29
		11	Mack	American	29
		19	Yellow Coach	American	29
		6	Yellow Coach	American	29
		5	Six Wheel	St. Louis Car Co.	31
		18*	Six Wheel	St. Louis Car Co.	63
		6	Dodge Graham	Dodge Graham	21

Buses Ordered by Railways During 1925—(Continued)

Name of Company	Total	No. of Each Type	Type of Chassis	Body Builder	Seating Capacity
Missouri—continued					
Missouri Power & Light Co.....	3	3	Mack	Mack	25
Springfield Traction Co.....	5	3	Yellow Coach	.....	.....
		2	Dodge	Graham	.....
St. Louis Elec. Terminal Ry.....	6	6	Yellow Coach	Yellow Coach	29
United Rys. of St. Louis.....	36	5	Six Wheel	St. Louis Car	29
		24	White	St. Louis Car	29
		2	White	U. R. C.	25
		4	White	Anheuser-Busch	29
		1	Mack	St. Louis Car	29
Ohio					
Cleveland Ry.....	101	30	White	Kuhlman	29
		30*	Six Wheel	Six Wheel	62
		1	Six Wheel	Six Wheel	29
		10*	Six Wheel	Six Wheel	62
		30	White	Kuhlman	29
Columbus, Urbana & Western Ry....	2	2	Reo	.....	21
Indiana, Columbus & Eastern Trac. Co.	1	1	Fageol	Fageol	22
Penn-Ohio Elec. Co.....	5	5	White	Bender	25
Southern Ohio Public Service Co.....	26	5	Ace	Ace	25
		2	Fageol	Fageol	28
		3	Studebaker	Studebaker	18
		4	Fageol	Fageol	22
		12	Studebaker	Studebaker	11
Youngstown & Suburban Ry.....	3	3	Fageol	Fageol	22
Youngstown Municipal Ry.....	2	2	White	Bender	25
Stark Elec. R.R.....	6	6	Yellow Coach	Yellow Coach	21
Wisconsin					
Madison Railways.....	6	6	Yellow Coach	Yellow Coach	29
Milwaukee Elec. Ry. & Light Co.....	19	5	Fageol	Fageol	31
		3	Yellow Coach	Yellow Coach	31
		2	Fageol	Fageol	25
		9	Yellow Coach	Yellow Coach	29
Wisconsin Power & Light Co.....	21	4	Fageol	Fageol	25
		3	Hudson	Hudson	7
		2	Yellow Coach	Yellow Coach	27
		5	Yellow Coach	Yellow Coach	30
Wisconsin Public Service Co.....	3	2	Reo	.....	21
		1	Yellow Coach	.....	25
Wisconsin Valley Elec. Co.....	8	2	Yellow Coach	Yellow Coach	21
		2	Yellow Coach	Yellow Coach	21
		2	Reo	McKinnon	13
		2	G. M. C.	McKinnon	18
Arkansas					
Arkansas Central Power Co.....	3	1	Yellow Coach	Yellow Coach	21
		1	Mack	Mack	21
		1	White	White	25
Hot Springs St. Ry.....	2	2	Reo	.....	.....
Florida					
Key West Elec. Co.....	4	4	Mack	Amer. Car Co.	29
Tampa Elec. Co.....	22	16	Mack	Birney	29
		6	Reo	Reo	21
Georgia					
Columbus Elec. & Power Co.....	13	8	Mack	Amer. Car Co.	29
		5	White	Amer. Car Co.	29
Georgia Ry. & Power Co.....	15	15*	Fageol	Fageol	60
Savannah Elec. & Power Co.....	2	1	Dodge	Graham	21
		1	Mack	Mack	29
Louisiana					
Baton Rouge Elec. Co.....	3	3	Mack	Birney	29
New Orleans Pub. Serv. Inc.....	14	1	Graham	Graham	21
		4	Yellow Coach	Yellow Coach	29
		6	Mack	Mack	29
		3	Fageol	Amer. Car Co.	29
Mississippi					
Mississippi Power & Light Co.....	1	1	Yellow Coach	Yellow Coach	21
Mississippi Power Co.....	10	8	Fageol	Fageol	21
		2	Reo	St. John	19
North Carolina					
Asheville Power & Light Co.....	2	2	White	.....	16
Carolina Power & Light Co.....	1	1	White	Bender	21
Durham Public Service Co.....	11	8	Reo	Fitzjohn	21
		3	Mack	Kuhlman	25
Southern Public Utilities Co.....	1	1	White	White	21
Tennessee					
Tennessee Elec. Power Co.....	5	5	Fageol	Fageol	29
Arizona					
Tucson Rapid Transit Co.....	5	2	Dodge	Graham	21
		2	Garford	Garford	21
		1	Reo	Locally Built	18
California					
Key System Transit Co.....	13	4	Dodge	Graham	16
		1	Dodge	Graham	21
		1	Pierce Arrow	.....	25
		4	Pierce Arrow	.....	29
		1	Pierce Arrow	.....	29
		2	Yellow Coach	Yellow Coach	29
Los Angeles Ry.....	40	20	.....	.....	.....
		20*	.....	.....	.....
Market St. Ry.....	1	1	Fageol	Fageol	29
Municipal Ry. of San Francisco.....	4	1	White	White	25
		3	Pierce Arrow	Cal. Motor Coach	29
Pacific Elec. Ry.....	5	3*	Fageol	.....	58
		2*	Moreland	Moreland	59
Pacific Gas & Elec. Co.....	3	3	Moreland	Moreland	16
Peninsular Ry.....	4	4	Fageol	Fageol	29
San Diego Elec. Ry.....	2	2	Dodge	Graham	.....
Colorado					
Denver & Interurban R.R.....	4	4	Yellow Coach	Yellow Coach	30
Denver Tramway.....	3	1	Fageol	Fageol	21
		1	Graham	Graham	21
		1	Studebaker	Auto Body Co	21
Idaho					
Boise St. Car Co.....	2	2	Pierce Arrow	Brown	29
Kansas					
Arkansas Valley Interurban Ry.....	3	3	White	.....	14
Kansas City, Leavenworth & Western Ry.....	6	5	Mack	Mack	25
		1	Graham	Graham	20
Topeka Ry.....	11	11	Mack	Mack	25

neer companies to engage in bus operation, the United Railways & Electric Company of Baltimore, in April purchased the East Fayette Street bus line in that city and added 37 more buses to the 44 which were in service at the beginning of the year.

Increase in the number of comparatively small electric railways operating buses has been relatively greater than in the number of large companies. This is because many of the larger railways were listed as operators last year. Among the newcomers of the former class are Gardner-Templeton Street Railway; Laconia Street Railway; Cumberland & Westernport Electric Railway; Black River Traction Company; Chambersburg & Shippensburg Railway; Lehigh Traction Company; Rio Grande Valley Traction Company; Wichita Falls Traction Company; Lewiston & Clarkston Transit Company; and in Canada, the Grand River Railway and the Windsor, Essex & Lake Shore Rapid Railways.

In general, the development during the past year has been greater among the urban street railways than among the interurbans. Among the new city companies now operating buses are those in Cleveland, Denver, Duluth, Erie, Indianapolis, Omaha, Pittsburgh, Portland, Wilkes-Barre and Worcester.

New bus operations by interurban electric railways have not been lacking, however. Following is a list of some of the companies which have undertaken such service: New Haven & Shore Line Railway; Boston & Worcester Street Railway; Washington & Old Dominion Railway; Auburn & Syracuse Electric Railroad; Rochester & Syracuse Railroad; Syracuse & Eastern Railroad; Lackawanna & Wyoming Valley Railroad; Charleston Interurban Railroad; Aurora, Elgin & Fox River Electric Company; Indianapolis & Cincinnati Traction Company; Terre Haute, Indianapolis & Eastern Traction Company; Denver & Interurban Railroad; Kansas City, Leavenworth & Western Railway.

Considering geographically the development of bus operation by electric railways during the past year, the largest proportionate increase is found to have been in the Southern states. Bus service has been undertaken in Atlanta, Ga.; Baton Rouge, La.; Chattanooga, Tenn.; Durham, N. C.; Hot Springs, Ark.; Key West, Fla.; Lynchburg, Va.; Roanoke, Va.; Savannah, Ga.; Tampa, Fla. Substantial increases in number of electric railways operating buses occurred also in other sections of the country, but development there was rela-

Buses Ordered by Railways During 1925—(Concluded)

Name of Company	Total	No. of Each Type	Type of Chassis	Body Builder	Seating Capacity
Nebraska					
Omaha & Council Bluffs St. Ry.....	5	5	White	Weir	25
Oklahoma					
Northeast Oklahoma R.R.....	3	3	Dodge	Graham	21
Oklahoma Ry.....	7	4	Dodge-Graham	Graham	21
Oklahoma Union Ry.....	27	17	Reo	Reo	21
		3	Mack	Mack	25
		1	Reo	Reo	15
		1	Reo	Reo	16
		2	Reo	Reo	20
		3	Reo	Reo	21
		3	Dodge	Graham	21
Oregon					
Portland Elec. Power Co.....	22	3	Fageol		29
		3	Yellow Coach		29
		3	Fageol		29
		2	Yellow Coach		29
		6	Yellow Coach		21
		2	Fageol	Gas-Elec	29
		3	Yellow Coach	Gas-Elec	29
South Dakota					
Sioux Falls Traction System.....	6	1	Dodge		17
		4	White	Eckland	25
		1	Hudson		7
Texas					
Abilene Traction Co.....	1	1	Reo	Fitzjohn	21
North Texas Traction Co.....	4	2	Reo	Reo	21
		2	Yellow Coach	Yellow Coach	21
Rio Grande Valley Traction Co.....	5	5	Reo	Reo	21
San Antonio Public Service Co.....	14	1	Yellow Coach	Yellow Coach	29
Hudson Elec. Co.....	2	1	Yellow Coach	Yellow Coach	21
		1	Dodge	Graham	21
Texas Electric Ry.....	6	1	Reo	Reo	16
		2	Studebaker	Studebaker	13
Wichita Falls Traction Co.....	2	2	Reo		21
Utah					
Utah-Idaho Central R.R.....	2	2	Fageol	Fageol	19
Washington					
Grays Harbor Ry. & Lt. Co.....	3	3	White	Local	29
Lewiston-Clarkston Transit Co.....	1	1	Studebaker	Auto Body Co.	...
Puget Sound Elec. Ry.....	4	1	Yellow Coach	Yellow Coach	25
		3	Yellow Coach	Yellow Coach	17
Puget Sound Int. Ry. & Powr. Co....	4	3	Fageol	Newell	26
		1	Studebaker	Auto Body Co.	21
Seattle Municipal Street Ry.....	10	5	Garford	Local	29
		5	Studebaker		21
Canada					
British Columbia Elec. Ry.....	9	6	Leyland	Local	29
		1	White	Local	29
		2	White	Local	29
Grand River Ry.....	3	3	Fageol	Fageol	29
Hydro Elec. Rys.....	4	4	Gotfredson	Commercial	21
Montreal Tramways.....	24	8	Yellow Coach		25
		10	White	Brown	25
		4	Six-Wheel		21
		2	Reo		21
Ottawa Elec. Ry.....	2	2	Reo	Ottawa Car Mfg. Co.	21
Toronto Transportatn Comm.....	36	3	White	T. T. C.	29
		15	Yellow Coach	T. T. C.	29
		6	Yellow Coach	T. T. C.	29
		3	Republic		30
		2	Ruggles		30
		6	Courier		30
		1	Courier		25
Windsor, Essex Lake Shore Rapid Rys.	2	2	Gotfredson	Gotfredson	18
Winnipeg Elec. Co.....	10	7	Reo	Railway Shop	21
		3	Dodge-Graham	Railway Shop	16
Porto Rico					
Ponce Elec. Co.....	3	3	Reo	Fitzjohn	21
Total.....	2,171				

*Denotes Double-Deck

tively less pronounced. The number of companies in each geographical division as reported in the statistical issues of ELECTRIC RAILWAY JOURNAL for 1924 and 1925 are given in the accompanying table, as well as the figures for Jan. 1, 1926.

New buses ordered during 1925 numbered 2171 as compared with 963 ordered in 1924. Buses acquired with the purchase of independent companies and re-

tained in service by electric railways account for the difference between the total increase of nearly 2,900 and the amount of the orders. On the other hand, the net increase is affected by the considerable number of buses which were scrapped during the year.

Among the large purchases during 1925 were 123 Graham Brothers 21-passenger buses for the Department of Street Railways, city of Detroit. The Cleveland Railway, Kansas City Railways, Los Angeles Railway, Gary Railways, and the Boston Elevated were companies which placed large orders during the year.

In the latter part of December the Public Service Railway placed an order for 333 gas-electric buses with the Yellow Coach Manufacturing Company. Electrical equipment is to be supplied by the General Electric Company. While the exact purchase price was not announced it is said to be approximately \$3,000,000. This is the largest single order for buses that has ever been placed by any electric railway in the United States or Canada.

Other automotive equipment ordered by electric railways also shows a large increase over previous years. Reports received show 284 motor trucks purchased in 1925 as compared with 105 in 1924, 148 in 1923, and 112 in 1922. The 1-ton type was the most popular size, with the 3½-ton type second. Others ranged in size from ½ ton to 7 tons. None of the companies reported the purchase of any trackless trolleys.

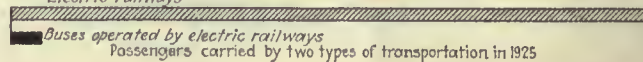
Purchases of new equipment for the year show a slightly different trend from those of previous years. A number of companies have acquired double-deck vehicles, among them being the railways in Atlanta, Baltimore, Cleveland, Kansas City and Los Angeles. The actual number of double-deck buses shown in the table of purchases for the

year, approximately 100, is less than for the preceding year, when 191 were ordered. This is explained by the fact that the order of the Philadelphia Rapid Transit Company for 125 such vehicles was included in the sta-

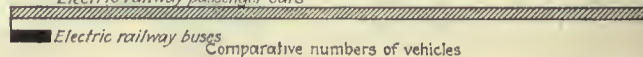
Geographical Classification of Electric Railways Operating Buses

	Jan. 1, 1924	Jan. 1, 1925	Jan. 1, 1926
New England States.....	14	19	29
Eastern States.....	31	43	74
Central States.....	39	48	83
Southern States.....	5	9	25
Western States.....	26	28	55
Canada.....	5	9	11
Panama.....	1	..	1
Porto Rico.....	..	..	1
Hawaiian Islands.....	..	..	1
Total.....	121	156	280

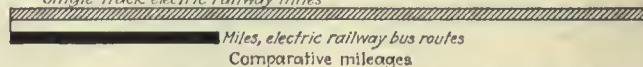
Electric railways



Electric railway passenger cars



Single track electric railway miles



Comparison of Transportation Services Furnished by Electric Railway Companies in the United States and Canada as of Jan. 1, 1926

Passengers carried by rail are estimated to be 16,000,000,000 and by electric railway buses approximately 800,000,000. Electric railway passenger cars number about 82,000 while some 5,300 buses are operated by these companies. Single-track electric railway mileage is 46,000 and bus routes total some 13,000 miles.

Bus Route Extensions During 1925

Name of Railway	Name of Operating Co.	City Miles	Intercity Miles	Touring Miles	Sightseeing Miles	Replaced Miles
Connecticut						
Connecticut Co.....		10.04	79.28	.....	.....	38.72
Hartford & Springfield St. Ry.....		.....	9.70	.....	.....	9.70
Waterbury & Milldale Tramway.....		.....	0.75	.....	.....	.....
Maine						
Central Maine Power Co.....		.....	12.00	.....	.....	4.50
York Utilities Co.....		8.50	34.50	.....	.....	4.50
Massachusetts						
Boston Elevated Ry.....		25.50	.....	.....	.....	32.00
Boston & Worcester St. Ry.....		6.00	.....	.....	.....	6.00
Eastern Massachusetts St. Ry.....		13.10	38.40	.....	.....	8.80
Gardner-Templeton St. Ry.....		.....	5.00	.....	.....	.....
Middlesex & Boston St. Ry.....		2.00	.....	.....	.....	.....
Springfield St. Ry.....		5.70	.....	.....	.....	1.32
Union St. Ry. of New Bedford.....		.....	34.00	.....	.....	.....
Worcester Consolidated St. Ry.....		3.00	68.00	.....	.....	10.10
New Hampshire						
Portsmouth Electric Ry.....	Boston & Maine Transp. Co.....	18.00	.....	.....	.....	18.00
Rhode Island						
Newport Electric Corp.....		6.90	40.00	.....	.....	20.00
United Electric Rys.....		.....	18.88	.....	.....	10.10
Vermont						
Bellevue Falls & Saxton River St. R.R.....	Pierce Bus Co.....	2.00	4.00	.....	.....	.....
District of Columbia						
Capital Traction Co.....		11.03	.....	.....	.....	.....
Washington & Old Dominion Ry.....		.....	16.80	.....	.....	.....
Washington Ry. & Electric Co.....		18.65	.....	.....	.....	2.63
Washington Ry. & Electric Co.....	City & Suburban Ry. of Washington.....	2.65	14.90	.....	.....	5.62
Washington-Virginia Ry.....		.....	23.00	.....	.....	.....
Maryland						
Cumberland & Westernport Electric Ry.....		.....	22.10	.....	.....	16.60
United Rys. & Electric Co.....	Baltimore Transit Co.....	4.57	.....	54.00	.....	.....
United Rys. & Electric Co.....	East Fayette St. Bus Co.....	23.45	.....	.....	5.50	.....
New Jersey						
Morris County Traction Co.....		.....	3.00	.....	.....	.....
Trenton & Mercer County Traction Corp.....	Central Transportation Co.....	42.70	.....	.....	.....	.....
New York						
Auburn & Syracuse Electric R.R.....	Mid-State Coach Lines, Inc.....	4.80	.....	.....	.....	1.90
Black River Traction Co.....	Watertown Transportation Co.....	1.24	.....	.....	.....	.....
Empire State R.R.....	Mid-State Coach Lines, Inc.....	7.00	.....	.....	.....	.....
International Ry.....	International Bus Corp.....	20.70	8.09	.....	.....	4.42
New York State Rys.....	.....	7.50	221.00	.....	.....	.....
Olean, Bradford & Salamanca Ry.....	O. B. & S. Bus Line.....	.....	9.00	.....	20.00*	9.00
Rochester & Syracuse R.R.....	Mid-State Coach Lines, Inc.....	.....	13.50	.....	.....	.....
United Traction Co., Albany.....	Capitol District Transp. Co.....	9.52	.....	.....	.....	1.24
Pennsylvania						
Buffalo & Erie Ry.....	Buffalo & Erie Coach Corp.....	0.50	3.00	.....	.....	.....
Chambersburg & Shippensburg Ry.....	Cumberland Valley Transit Co.....	2.00	9.00	.....	.....	9.00
Citizens Traction Co.....	Citizens Transit Co.....	4.00	22.00	.....	.....	9.00†
Erie Rys.....	Erie Coach Co.....	3.00	.....	.....	.....	.....
Lehigh Traction Co.....	Hazleton Auto Bus Co.....	1.40	4.50	.....	.....	.....
Lehigh Valley Transit Co.....	Lehigh Valley Transportation Co.....	8.09	.....	.....	.....	.....
Monongahela-West Penn Public Service Co.....	.....	.....	32.80	.....	.....	.....
Schuylkill Ry.....	Schuylkill Transportation Co.....	.....	10.00	.....	.....	.....
Seranton Ry.....	.....	0.50	2.00	.....	.....	.....
Shamokin & Edgewood Electric Ry.....	Shamokin & Trevorton Bus Line.....	1.00	8.00	.....	.....	.....
Stroudsburg Traction Co.....	E. Stroudsburg Bus Co.....	8.50	.....	.....	.....	.....
Westmoreland County Ry.....	.....	.....	5.00	.....	.....	.....
Virginia						
Roanoke Ry. & Electric Co.....	Roanoke Rapid Transit Co.....	2.60	8.50	.....	.....	.....
Virginia Electric & Power Co.....	Richmond Rapid Transit Co.....	9.00	.....	.....	.....	.....
Virginia Electric & Power Co.....	.....	17.00	.....	.....	.....	.....
West Virginia						
Charleston Interurban R.R.....		2.50	.....	.....	.....	.....
Monongahela West Penn Public Service Co.....		.....	32.80	.....	.....	.....
Illinois						
Aurora, Elgin & Fox River Electric Co.....		.....	12.48	.....	.....	8.91
Central Illinois Public Service Co.....		9.00	.....	.....	.....	7.41
Chicago & Joliet Electric Ry.....		6.00	.....	.....	.....	.....
Chicago North Shore & Milwaukee R.R.....		.....	123.50	.....	*	.....
Chicago & West Town Ry.....		4.50	.....	.....	.....	.....
East St. Louis Ry.....		3.40	3.60	.....	.....	2.00
Illinois Power Co.....		2.08	.....	.....	.....	.....
Illinois Power & Light Corp.....		0.75	.....	.....	.....	0.75
Rockford City Traction Co.....		3.30	.....	.....	.....	.....
Rockford & Interurban Ry.....		.....	33.50	.....	.....	.....
Indiana						
Indianapolis & Cincinnati Traction Co.....		.....	28.00	.....	.....	.....
Indianapolis Street Ry.....		56.88	.....	.....	.....	.....
Interstate Public Service Co.....		.....	103.00	.....	.....	.....
Terre Haute, Indianapolis & Eastern Trac. Co.....		10.40	.....	.....	.....	.....
Gary Rys.....		34.00	250.00	.....	.....	.....
Union Traction Co.....		.....	127.60	.....	.....	.....
Iowa						
Dubuque Electric Co.....		5.30	.....	.....	.....	.....
Iowa Southern Utilities Co., Burlington.....		7.00	.....	.....	.....	2.50
Kentucky						
Kentucky Traction & Terminal Co.....	Kentucky Coach Co.....	10.00	.....	.....	.....	.....
Louisville Ry.....	Kentucky Carriers.....	4.90	.....	.....	.....	.....
Michigan						
Department of St. Rys., Detroit.....		79.97	.....	.....	.....	.....
Grand Rapids Ry.....		1.42	.....	.....	.....	.....
Michigan Electric Ry.....	Southern Michigan Transportation Co.....	.....	105.50	.....	.....	.....
Detroit United Rys.....		25.40	10.40	.....	.....	14.60

* Summer operation only.

† Titusville Traction Co.

Bus Route Extensions During 1925—(Concluded)

Name of Railway	Name of Operating Co.	City Miles	Inter-city Miles	Touring Miles	Sightseeing Miles	Replaced Miles
Minnesota						
Duluth St. Ry.	Duluth Coach Co.	2.00	8.15	.....	.....	.....
Twin City Rapid Transit Co.	Twin City Motor Bus Co.	.....	52.30	.....	.....	.....
Missouri						
Kansas City Clay County & St. Joseph Ry.			60.00	.....	.....	.....
Kansas City Rys.		43.98	.....	.....	.....	.....
Missouri Power & Light Co.		3.00	.....	.....	.....	.....
St. Louis Terminal Ry.		8.75	.....	.....	.....	.....
United Rys. of St. Louis	St. Louis Bus Co.	17.45	.....	.....	1.50	.....
United Rys. of St. Louis	Missouri Electric R.R.	.....	12.90	.....	.....	.....
Ohio						
Cleveland Railway		40.14	.....	.....	.....	1.76
Community Traction Co.		0.51	.....	.....	.....	0.51
Indiana, Columbus & Eastern Traction Co.	Dayton & Columbus Transportation Co.	.....	24.00	.....	.....	.....
Stark Electric R.R.		10.00	.....	.....	.....	3.00
Wisconsin						
Madison Rys.		10.00	.....	.....	.....	.....
Milwaukee Electric Ry. & Light Co.		5.82	103.00	.....	.....	1.28
Wisconsin Power & Light Co.		2.00	283.50	25.00	.....	2.00
Wisconsin Valley Electric Co.		1.70	.....	.....	.....	.....
Florida						
Key West Electric Co.		2.30	.....	.....	.....	1.90
Tampa Electric Co.		6.00	.....	.....	.....	.....
Georgia						
Columbus Electric & Power Co.	Columbus Transp. Co.	12.41	.....	.....	.....	5.92
Georgia Ry. & Power Co.	Atlanta Coach Co.	19.20	.....	.....	.....	.....
Georgia Ry. & Power Co.	Georgia Ry. & Light Co.	3.81	.....	.....	.....	.....
Savannah Electric & Power Co.		1.25	.....	.....	.....	0.41
Louisiana						
Baton Rouge Electric Co.		2.60	.....	.....	.....	.....
New Orleans Public Service, Inc.		5.91	.....	.....	.....	1.12
North Carolina						
Asheville Power & Light Co.		2.00	.....	.....	.....	.....
Carolina Power & Light Co.		1.50	.....	.....	.....	.....
Durham Public Service Co.		8.50	.....	.....	.....	4.10
Tennessee						
Tennessee Electric Power Co.		5.50	.....	.....	.....	.....
Arizona						
Tucson Rapid Transit Co.		5.15	.....	.....	.....	.....
California						
Los Angeles Ry.		18.70	.....	.....	.....	.....
Municipal Ry. of San Francisco		1.30	.....	.....	.....	.....
Peninsular Ry.		3.87	.....	.....	.....	3.87
San Diego Electric Ry.		4.50	.....	.....	.....	.....
Pacific Gas & Electric Co.		3.93	.....	.....	.....	.....
Market St. Ry.		0.82	.....	.....	.....	1.38
Kansas						
Arkansas Valley Interurban Ry.		8.00	68.50	.....	.....	.....
Kansas, Leavenworth & Western Ry.	Leavenworth Transportation Co.	5.36	.....	.....	.....	5.36
Topeka Ry.		8.80	.....	.....	.....	.....
Nebraska						
Omaha & Council Bluffs St. Ry.		8.50	.....	.....	.....	.....
Oklahoma						
Northeast Oklahoma R.R.			11.00	.....	.....	.....
Oklahoma Ry.		7.00	.....	.....	.....	.....
Texas						
Abilene Traction Co.		4.00	.....	.....	.....	.....
Wichita Falls Traction Co.		3.00	.....	.....	.....	.....
Washington						
Grays Harbor Ry. & Light Co.	Twin City Transit Co.	1.80	.....	.....	.....	.....
Lewiston & Clarkston Transit Co.		8.00	.....	.....	.....	.....
Pacific Northwest Traction Co.			102.00	.....	.....	.....
Portland Electric Power Co.		6.64	.....	.....	.....	.....
Seattle Municipal Street Ry.		10.60	.....	.....	.....	1.10
Canada						
British Columbia Electric Ry.		2.20	12.00	.....	.....	.....
Grand River Ry.		2.50	2.00	.....	.....	4.50
Montreal Tramways		10.85	8.80	.....	.....	.....
Toronto Transportation Commission		6.24	.....	.....	34.00	.....
Windsor, Essex & Lake Shore Rapid Ry.	Highway Motor Coach Lines	6.38	30.23	.....	.....	.....
Porto Rico						
Ponce Electric Co.		3.00	.....	.....	.....	.....
Totals		936.41	2,399.46	79.00	61.00	297.53

tistics for 1924, although the vehicles did not actually go into service until the present year.

Gas-electric buses have appeared for the first time this year in a number of localities. Besides those of the Philadelphia Rapid Transit Company and the recent order by the Public Service Railway, gas-electrics have been purchased by the Georgia Railway & Power Company, the Kansas City Railways and the United Traction Company of Albany, N. Y. A feature of certain of the buses bought by the Kansas City Railways is an automatic rear exit. This is the first time that such a device has been tried and thus far the Kansas City company is the only operator to include this feature.

The parlor car type of bus appears to be growing in popularity as compared with the so-called street car type, although the number of the latter type purchased during the past year remains somewhat larger than the number of the de luxe type. An interesting example of the way these may be used by an electric railway is the operation of the Chevy Chase bus line of the Capital Traction Company, Washington, D. C. Under this plan commodious buses are operated from the Chevy Chase residential district downtown to the shopping section of the city. An extra fare is charged on account of the superior quality of the transportation service which is provided.

Electric Railway Costs and Fares

Continue Stable in 1925

Only a Few Points Variation Has Occurred in Major Index Figures During the Year—Discussion of Trends Indicates Stability for Coming Year—Several Changes in Method of Computing Figures

By *Albert S. Richey*

Electric Railway Engineer, Worcester, Mass.

ON THE following page there is a chart showing graphically the course during the past twelve years of five index numbers which may be of interest to electric railway owners and operators. The indexes included are of (1) wholesale commodities, (2) electric railway construction costs, (3) electric railway operating material costs, (4) electric railway wages, and (5) street railway fares. Accompanying the graphic presentation is a tabulation showing the average indexes for each year, 1913 through 1920 inclusive, and the monthly indexes from January, 1920, to and including the latest available data. Each index is shown on the base of 1913 = 100. The five indexes here shown are among the twelve which make up the *Conspectus of Indexes* which is compiled monthly by the writer and published regularly in the Financial and Corporate section of the *ELECTRIC RAILWAY JOURNAL*—usually in the fourth issue of each month. Similar charts and tables have been published in the *Annual Statistical Numbers*—the first issue of the *JOURNAL* in January in 1923, 1924 and 1925. At this time the new Electric Railway Construction Cost Index of the American Electric Railway Association is included, replacing the general Construction Cost Index of the *Engineering News-Record* which has appeared in the charts previously published.

COMPUTATION OF THE INDEXES

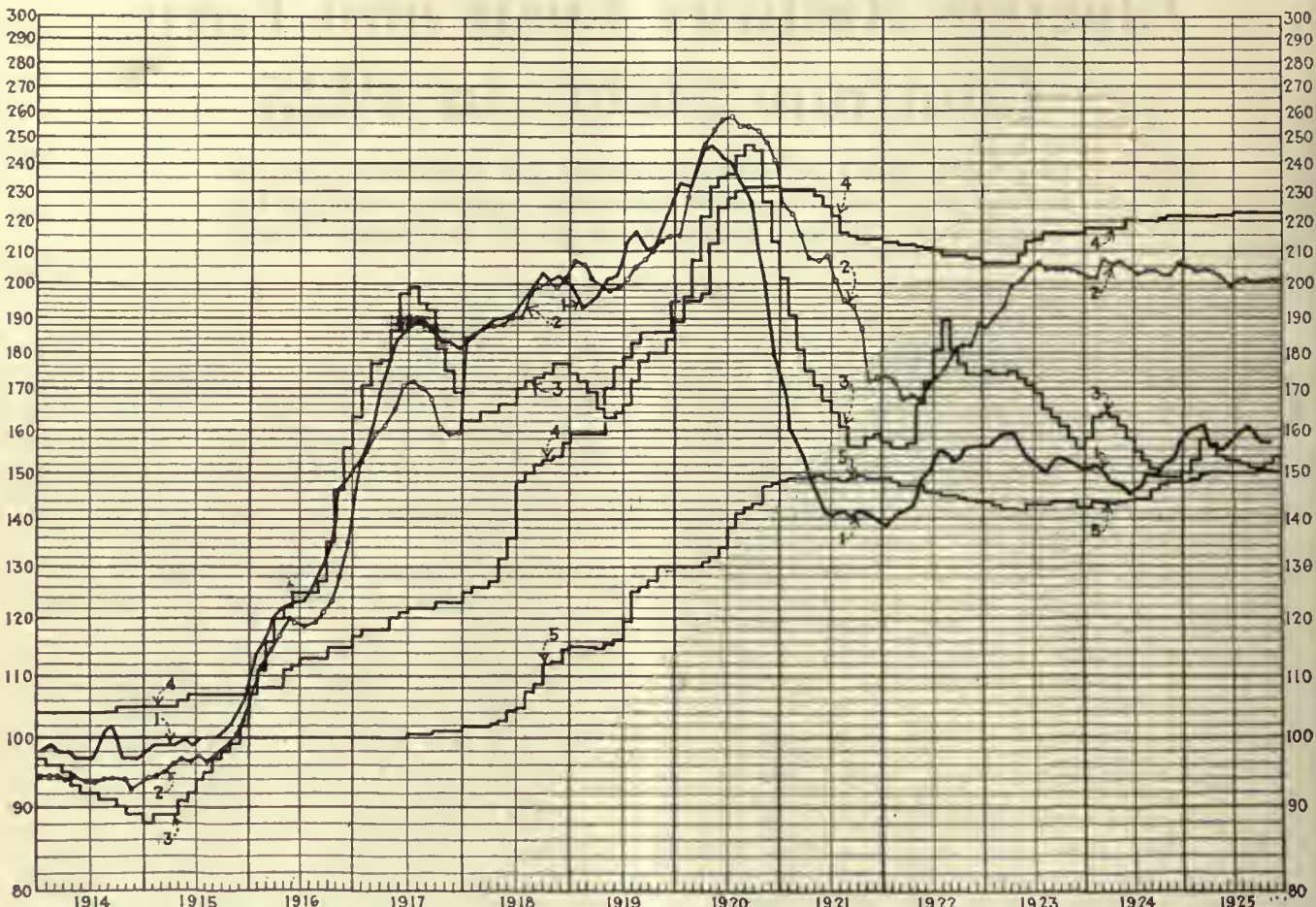
The various indexes and the methods used in their computation will be given here, inasmuch as it has been two years since this résumé has included such a statement, and as additional data are now included. The Wholesale Commodity Index of the United States Bureau of Labor Statistics represents the course of the weighted average price of more than 400 commodities, as computed monthly by the bureau. This index is perhaps the most authoritative, the most widely used, and most often quoted of any which purposes to show the trend of the general price level. The various commodities on which prices are collected and used in the computation of this index include groups such as farm products, foods, cloths and clothing, fuel and lighting, metals and metal products, building materials, chemicals and drugs, house furnishing goods, and miscellaneous items. Separate indexes are published by the bureau covering these constituent groups as well as the all-commodity index which represents the combination of all groups and which is the one here quoted. The latest bulletin of the Bureau on Wholesale Prices is No. 390, issued in July, 1925, and covering the period 1890 to 1924. This bulletin contains a description of the weightings and the methods used in computing these

indexes, together with data as to actual and relative prices of the various commodities and relative prices of the groups of commodities which enter into the index. The index numbers as shown in that bulletin cover the entire period beginning with 1890, in which year the all-commodities index stood at 80.5. Its low point was 66.7 for the year 1896, after which year it gradually increased, reaching a value of 100.9 in 1910. Its course since 1913 is shown by the data included herewith.

The Electric Railway Construction Cost Index of the American Electric Railway Association was proposed by the valuation committee of that association at the Atlantic City convention last October. The report of that committee, quoted on page 584 of the Oct. 10, 1925, issue of the *JOURNAL*, contains a description of the data and method used in their compilation. It is still in a tentative form and subject to change as data are received from members of the association comparing actual valuation figures with the index as proposed. It may be assumed, however, that it is a fairly good index of the construction cost of the average electric railway, excluding land values, and it may be used to determine at least approximately what figure might be arrived at by a valuation of an electric railway property on the basis of present prices, if a valuation of the same property has been made at some previous time, using prices then current. The index here shown for the year 1916 is not as printed in the report of the valuation committee last October, as it has been corrected here to correspond with changes which are just now being made by the *Engineering News-Record* in its indexes of common labor and general construction costs, these being constituent elements of the Electric Railway Construction Cost Index. The change thus made necessary in this index for the year 1916 brings it more closely in line with available data on electric railway valuations.

The Electric Railway Operating Materials Cost Index is not one of construction costs but applies to the materials used in electric railway maintenance and operation. The weighting of the cost of such materials differs, of course, from that used in a construction cost index, and there is a further material difference in that this index does not include any labor costs which make up so large a part of the first cost of railway construction. The index, however, does include fuel cost, at a weighting of 40 per cent of the total. While many railways purchase power, most power contracts include a so-called coal clause which varies the price of power with the cost of coal, and it is for this reason that the cost of fuel for power is included in the index,

Trend of Construction Costs, Wages and Fares, 1913-1926, as Collected by Albert S. Richey



1. Wholesale prices all commodities (U. S. Bureau of Labor Statistics).

2. Electric railway construction costs (American Electric Railway Association statistics).

3. Electric railway operating materials costs (Richey). Includes fuel for power and weighted according to average use in maintenance and operation.

4. Electric railway wages (Richey).

Maximum hourly wages of platform men, weighted according to number of men.

5. Street railway fares (Richey). U. S. cities (except New York) weighted according to population.

	Wholesale Prices, All Commodities (U. S. Bur. Lab. Stat.)	Elec. Ry. Construction Costs (Am. Elec. Ry. Assn.)	Elec. Ry. Operating Materials Costs (Richey)	Elec. Railway Wages (Richey)	Street Railway Fares (Richey)		Wholesale Prices, All Commodities (U. S. Bur. Lab. Stat.)	Elec. Ry. Construction Costs (Am. Elec. Ry. Assn.)	Elec. Ry. Operating Materials Costs (Richey)	Elec. Railway Wages (Richey)	Street Railway Fares (Richey)
1913 average.....	100.0	100.0	100.0	100.0	100.0	September.....	153.3	180.5	181.0	207.8	144.8
1914 average.....	98.1	94.0	92.6	104.2	100.0	October.....	154.1	182.4	176.9	207.8	144.6
1915 average.....	100.8	97.3	93.5	106.2	100.1	November.....	155.5	182.6	174.4	207.5	144.1
1916 average.....	126.8	119.8	126.2	111.6	100.1	December.....	156.2	187.4	174.1	207.7	143.7
1917 average.....	177.2	162.7	181.9	120.6	100.5	1923					
1918 average.....	194.3	192.5	168.8	140.5	106.2	January.....	155.8	187.3	175.2	207.1	143.4
1919 average.....	206.4	205.1	172.2	174.0	120.7	February.....	156.7	190.6	173.9	207.1	143.4
1920 average.....	226.2	244.7	224.6	217.3	137.2	March.....	158.6	194.8	174.2	206.8	142.4
1920						April.....	158.7	199.0	175.3	207.0	142.3
January.....	233.2	214.4	189.3	195.0	129.9	May.....	156.2	201.0	173.1	209.0	142.1
February.....	232.4	227.7	196.2	195.0	129.9	June.....	153.5	204.1	171.3	212.6	142.9
March.....	234.4	234.1	207.3	195.0	130.2	July.....	150.6	205.3	169.1	213.5	142.9
April.....	244.6	246.1	221.1	197.0	131.1	August.....	150.1	204.3	165.5	216.2	142.9
May.....	246.7	252.9	231.7	213.0	131.9	September.....	153.7	204.0	163.2	216.4	143.4
June.....	243.3	256.1	235.6	226.0	134.0	October.....	153.1	204.3	160.9	216.4	143.5
July.....	240.7	256.4	237.3	228.0	138.0	November.....	152.1	204.4	158.3	216.4	143.5
August.....	231.4	254.0	242.7	231.0	141.5	December.....	151.0	203.3	155.5	216.4	142.4
September.....	226.2	254.2	247.5	232.0	142.6	1924					
October.....	211.3	252.0	245.2	232.0	143.3	January.....	151.2	203.0	158.5	217.4	142.6
November.....	196.4	247.6	227.4	232.0	147.0	February.....	151.7	203.8	163.2	217.4	143.1
December.....	179.2	240.6	213.4	232.0	147.5	March.....	149.9	206.8	163.9	217.5	143.1
1921						April.....	148.4	205.5	162.8	217.7	143.2
January.....	169.8	224.9	201.6	231.5	148.2	May.....	146.9	206.7	160.8	217.8	143.5
February.....	160.1	223.4	190.8	231.4	148.6	June.....	144.6	204.8	157.6	220.0	143.8
March.....	155.4	215.9	180.8	231.4	148.9	July.....	147.0	203.7	154.9	220.0	144.2
April.....	147.9	208.0	174.7	231.3	149.1	August.....	149.7	204.3	152.6	220.0	144.3
May.....	145.5	207.3	171.0	228.2	149.6	September.....	148.8	204.3	151.4	220.1	146.2
June.....	141.6	208.0	166.6	224.6	148.9	October.....	151.9	203.2	148.5	220.6	149.1
July.....	141.0	200.8	163.6	221.3	149.0	November.....	152.7	203.7	148.6	220.7	149.5
August.....	141.5	195.3	160.4	215.5	148.7	December.....	157.0	205.6	148.7	220.8	149.6
September.....	141.5	193.6	156.1	215.1	148.9	1925					
October.....	141.6	186.6	156.3	214.3	149.6	January.....	160.0	205.3	150.3	221.0	149.6
November.....	140.7	172.4	158.0	214.2	148.9	February.....	160.6	203.9	153.1	221.0	149.6
December.....	139.8	172.6	159.1	214.0	148.6	March.....	161.0	204.4	158.4	221.5	149.9
1922						April.....	156.2	204.1	157.3	221.6	150.0
January.....	138.3	172.6	157.0	212.6	148.6	May.....	155.2	202.0	153.9	222.2	150.0
February.....	141.4	171.9	156.4	212.6	147.8	June.....	157.4	200.0	152.4	222.4	150.0
March.....	142.2	167.7	155.8	211.9	147.4	July.....	159.9	200.1	152.6	222.5	150.2
April.....	142.6	168.6	157.0	211.9	147.4	August.....	160.4	201.0	151.6	222.6	150.3
May.....	147.6	167.4	166.0	211.5	147.4	September.....	159.7	200.5	150.9	222.7	150.6
June.....	149.6	171.0	172.0	210.8	145.5	October.....	157.6	202.7	150.9	222.8	151.0
July.....	154.9	173.8	180.8	210.2	145.5	November.....	157.7	202.4	152.0	222.8	150.7
August.....	155.0	176.0	188.9	208.3	144.9	December.....	.....	202.2	153.9	223.0	150.7

which may therefore be taken as an index of the cost of operating materials including power cost, when the latter is purchased under a coal clause. The remaining 60 per cent of the weighting of the materials index is made up of the costs of metals and metal products, lumber and building materials. The weighting of these individual items was determined upon after a careful study of the cost of materials used by a number of railway companies in various parts of the country over a period of years.

The Index of Electric Railway Wages as here shown is as computed monthly by the writer. The data used are the maximum wage rates of conductors and motor-men on two-man cars on 144 companies in the United States, employing a total of 108,175 platform men. These rates are weighted on the basis of the number of platform men employed by the various companies; the index therefore indicates the trend of the average platform man's hourly rate of wage. Previous to October, 1924, this index was weighted according to the number of passenger cars operated by the various companies. As noted on page 787 of the JOURNAL for Nov. 1, 1924, the weighting then was changed to the number of platform men, as above described, and the index was recalculated for the years 1923 and 1924. Up until October of this year, 103 companies were included, but at that time, additional companies were added, bringing the total number up to 144, so that the index now includes all companies in the United States which employ more than one hundred platform men each. The addition of 41 companies, all of which were small in the number of men employed, made practically no change in the index numbers as published for the preceding three years, and consequently no revision has been made in the index numbers as previously published on account of the additional data used.

The Index of Street Railway Fares, as here shown, is as computed by the writer, and includes all cities in the country with a population of 50,000 or more, except New York City. The index is weighted in accordance with the population of the various cities, and the fares used are, as nearly as it is possible to determine them, the average in the various cities, including cash and regular ticket or token fares. Ticket or token rates used are those available to all riders at all times of the day; pupils', workmen's or other special forms of tickets are not included. Pass and free transfer riders are not included in arriving at the averages, but where a charge is made for a transfer such charge and the proportion of original riders paying it are considered. The multiplying factor between the Richey Fare Index as here presented (on the base of 1913 = 100) and the average fare in cents is 0.048425. The average fare in cents may be found for any month by multiplying the index number as here shown by that factor, which represents the average fare in 1913.

TRENDS SHOWN BY THE INDEXES FOR 1925

In the articles corresponding to this which were printed in the Statistical Issues of the JOURNAL for 1924 and 1925, attention was called to the apparent stabilization of electric railway costs, as compared with the large and rapid fluctuations in labor and material costs which characterized the years during and immediately following the world war. This tendency is again borne out by the figures for 1925.

The Wholesale Commodity Index averages several points higher than in 1924, its fluctuations during the

year just passed having been between 155 and 161, while during the preceding year its average was 150.

The Electric Railway Construction Cost Index is still following the almost horizontal course started in the middle of 1923, although for the past seven months it has been 1 or 2 per cent lower than during the preceding two years. This is due primarily to a slight falling off in average rates paid for common labor, as there has been very little change in its other constituents.

The Index of Operating Materials Costs, which with some minor fluctuations followed a general downward trend from the middle of 1922 to the end of 1924, showed an increase during the first half of 1925, followed by a decline during the last half of the year, and an increase in December, so that at present it is $3\frac{1}{2}$ per cent higher than a year ago.

The Index of Electric Railway Wages shows an increase during the year of 1 per cent, this being due principally to increases in Cleveland, Detroit, Philadelphia, Seattle, Minneapolis and St. Paul, and the Eastern Massachusetts Street Railway. With very few and minor exceptions, no other increases have been reported during the year, but there have been many renewals and extensions of existing rates. No decreases have been reported during the year. Wage increases have been granted, effective as of Jan. 1, 1926, in Buffalo and in Oakland; the effect of these changes will be to increase the index about 0.7 point or 0.3 per cent.

The Index of Street Railway Fares has increased slightly during the year. The weighted average fare was 7.24 cents at the beginning of the year. This rose to the peak in October, principally due to increases in Buffalo, Minneapolis, St. Paul, Omaha, South Bend, and the eastern Massachusetts cities. Since October, it has been slightly reduced by the reduction in fares in Cincinnati. The October index of 151.0, corresponding to an average fare of 7.31 cents, is the highest point which this index has reached. The previous peak was in October, 1921, when the index stood at 149.6, corresponding to an average fare of 7.24 cents. The increase in fares in Rochester, as of Jan. 1, 1926, will almost, if not quite, bring the index back to its peak of October, 1924.

Among other indexes regularly included in the monthly Conspectus but not charted or tabulated here, the General Construction Cost Index to the *Engineering News-Record* stands at 205.95 in December, a reduction of 2.63 points or $1\frac{1}{4}$ per cent since December, 1924; the average for the year 1925 is 206.63, which is 8.67 points or 4 per cent under the average for 1924. Bradstreet's Index of Wholesale Commodities, which stood at 9.2115 as an average for 1913, is 14.4054 on Dec. 1, 1925; this is an increase of 0.8765 point or $6\frac{1}{2}$ per cent since December, 1924; the average for 1925 is 13.9445, which is an increase of 1.0773 points or $8\frac{1}{2}$ per cent over the average for 1924. The United States Bureau of Labor Statistics Index of Retail Food Costs is 167.1 for November, 1925, an increase of 17 points or 11 per cent over the index for November, 1924. The Cost of Living Index of the National Industrial Conference Board is 171 for November, 1925, an increase of six points or $3\frac{1}{2}$ per cent since November, 1924.

Of the indexes relating to general business conditions, the unfilled steel orders of the United States Steel Corporation were slightly in excess of 400,000 and 500,000 tons on Nov. 30, last, as compared with about 4,000,000 tons a year before; throughout 1925 the

monthly reports of unfilled steel orders have exceeded the corresponding months of 1924 by amounts averaging 333,000 tons, or about $8\frac{1}{2}$ per cent. The monthly reports of bank clearings outside of New York City also have consistently shown increases over 1924 throughout the year, while at least since March, the number of business failures as well as the liabilities have been less than during the same period in 1924. These indexes, as well as others relating to the state of general business, indicate slightly better conditions and more activity during 1925 than in 1924.

TREND OF OPERATING COSTS

In the résumé corresponding to this, which was printed in the Statistical Number of the JOURNAL a year ago, two of the Richey Indexes (operating material costs and wages) were combined to arrive at an indication of the trend of electric railway operating expenses. This was done under the assumption that a fair present distribution of operating expense is wages $62\frac{1}{2}$ per cent, material $22\frac{1}{2}$ per cent, and other expense 15 per cent. The "other" expense is that part of the operating expense which is neither wages nor material, such as salaries, general office expense, advertising, accidents, etc., and it was assumed that such "other" expense varies in the same ratio as wages and material combined. This combination also involves the assumption that all wages paid by the electric railways have varied the same as the wages of the platform men. With all of these assumptions, the 1925 change in average electric railway operating costs (exclusive of fixed charges) was as follows:

	Wages	Materials	Operating Expense
Index at end of 1924.....	220.8	148.7	201.7
Index at end of 1925.....	223.0	153.9	204.7
Increase during 1925, per cent	1.0	3.5	1.5

On this basis, then, which does not take into account such economies as those made possible by the one-man car, average electric railway operating expenses (not including fixed charges) in the United States at the end of 1924 were a little more than double those of 1913; during 1925 they increased 3 points, or $1\frac{1}{2}$ per cent; and it may be noted that during the same periods the average street railway fares increased 50.7 per cent since 1913, and 0.74 per cent during 1925.

It should be borne very definitely in mind, in considering any of the figures shown or statements made in this article, that they are based on average conditions of the country as a whole, and that in specific locations or cities individual experience is quite likely to show different results. These country-wide trends, however, are of great value for comparison with individual experience.

Annual Table of Statistics of the Industry

IN ADDITION to the statistics contained in this issue, ELECTRIC RAILWAY JOURNAL publishes annually a table of general statistics of the electric railway industry, based on the McGraw Electric Railway Directory. This directory is published annually in February, and statistics from the February, 1925, directory were published in the issue of this paper for March 7, 1925.

The editors of this paper are now compiling the statistics for this annual table from the reports being received for the February, 1926, McGraw directory and hope to publish the results in tabular form in some issue of this paper during January. This table will show,

as usual, by states, the number of operating electric railway companies, miles of track and number of passenger motor cars, passenger trail cars, electric locomotives, freight motor cars, freight trail cars, service cars and other types of cars owned by the electric railways in the United States.

Damages to Electric Railways by Earthquakes

ELECTRIC railway cars destroyed by the earthquake of Sept. 1, 1923, in Japan, totaled 955, according to a paper presented at the International Conference of Large Transmission Systems, held in Paris in June of this year. Practically all of these cars were destroyed by the fire following the earthquake. The actual damage done by the quake itself to the electric railways was mostly to the track and roadbed. Sinking of the roadbed naturally caused a corresponding movement of the poles, with some damage to the feeders and trolley lines. There was also considerable damage to bridges and culverts, but tunnels did not suffer much damage. That suffered was mainly at the entrances.

Within the built-up city areas, such as in Tokyo and Yokohama, fire followed the earthquake, causing the losses of cars already mentioned. The chief sufferer was the municipality of Tokyo, which lost altogether 534 double-truck cars and 290 single-truck cars.

By Sept. 1, 1924, more than a year after the disaster, the miles of track and number of electric cars in operation had returned to the status of before the earthquake.

Building a Bridge in a Day

WHEN the city of North Milwaukee decided to build a new bridge on 32d Street near Hampton Road it became necessary for the Milwaukee Electric Railway & Light Company to devise some way to keep the cars in operation over the creek while the new bridge was under construction. After considering several kinds of operation it was decided to construct a temporary bridge over the old bridge, allowing sufficient space in between the two structures so as not to interfere with the construction of the new bridge. During the night of Saturday, Sept. 12, sufficient material was delivered with which to construct this bridge, consisting mainly of piles, rails, 12-in. x 12-in. caps and ties.

On the morning of Monday, Sept. 14, actual work was started on the temporary bridge. Commencing at 8 o'clock the cars were stubbed on either side of the bridge, the trolley wire was shifted to one side and the pile driver was set up for the purpose of driving piles for the bents of the temporary structure, after which the old track, deck and old bridge were removed. By noon the piles for the three bents needed had been driven. The temporary track was supported on a deck, using eight 62-ft. 7-in. 102 T-rail, four being placed parallel and under each running rail of the bridge. About all that remained to be done was to place run-offs at each end of the bridge. These were made by using ties and timber, making an easy incline at each side. Temporary cross-over points were used to connect the temporary track with the permanent track. By 5:30 p.m. the trolley wire had been replaced and cars were operating over the new temporary bridge.

—*Rail and Wire.*

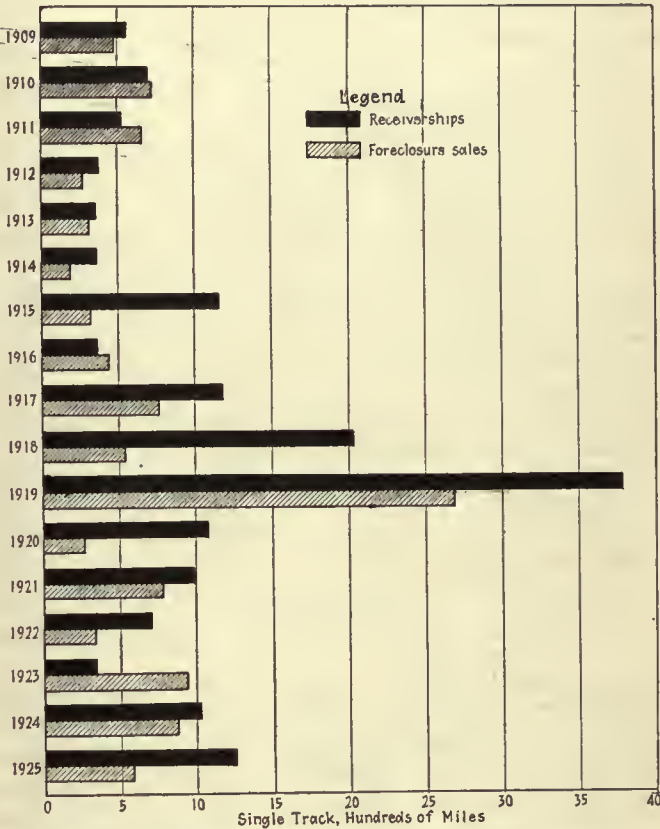
Receiverships Reduced in 1925

Fewer Roads Were Thrown in Receivership During the Year, Although the Failure of One Large Property Increased the Mileage Over That in 1924—Many Roads Restored to Their Owners, While Others Are on the Way to Terminate Receiverships Early This Year

WITH the number of electric railways in receivership gradually decreasing and reorganizations and merging of properties not in receivership the favorable outlook for the industry increases. There has been much activity along these lines during the past year, along with the trend toward co-ordination and strengthening the existing roads. While the number of miles of track involved is now about 4,165, slightly more than last year, there are fewer companies involved. Four companies comprising some 68 miles of track have gone through foreclosure proceedings and are now in the process of reorganization, but the final steps have not been perfected. These are therefore included in the table as still being in receivership.

The most important reorganization the past year was that of the Denver Tramway with 226 miles of single track, which becomes the Denver Tramway Corporation.

Another important reorganization was that of the Chicago, Lake Shore and South Bend Railroad, a 71-mile



The Mileage of Electric Railways Going into Receiverships and Those Sold at Foreclosure Is Presented Graphically

interurban. A receiver for this road was appointed on Feb. 28, the foreclosure sale took place June 29, and by July 13 it had been reorganized as the Chicago, South Shore & South Bend Railroad and the receiver discharged.

The Cleveland, Alliance & Mahoning Valley Railway was sold at receiver's sale to the Northern Realty Company, a subsidiary of the Northern Ohio Traction & Light Company, and is now operating as an important link in the freight handling of the latter company.

Table I—Electric Railway Receiverships—1925

	Miles of Single Track Involved	Outstanding Securities—		
		Stock	Bonds	Receivers' Certificates
Boston & Worcester Street Ry., Framingham, Mass.....	83.00	\$2,482,200	\$2,520,000	None
Laconia Street Ry., Laconia, N. H. Cumberland & Westernport Electric Ry., Frostburg, Md.....	8.00	140,300	91,000	None
Biinghamton Railway, Binghamton, N. Y.....	25.00	625,000	655,000	None
Frankford, Tacony & Holmesburg Street Ry., Philadelphia, Pa.....	49.52	978,895	2,812,825	None
Chicago, Lake Shore & South Bend Ry., Michigan City, Ind. (1).....	16.18	500,000	400,000	None
Indianapolis & Cincinnati Traction Co., Indianapolis, Ind.....	70.86	6,000,000	4,692,000	None
Detroit United Ry., Detroit, Mich. Wahpeton Breckenridge Street Ry., Breckenridge, Minn.....	101.00	3,600,000	2,400,000	\$112,000
Tiffin & Fostoria Ry., Tiffin, Ohio.. Helena Light & Railway Co., Helena, Mont.....	613.89	25,000,000	29,745,500	None
Salt Lake & Utah Railroad, Salt Lake City, Utah.....	1.00	42,500	None	None
Oklahoma Railway, Oklahoma City, Okla. (3).....	15.00	(2)	(2)	(2)
Tulsa Street Railway, Tulsa, Okla..	18.50	935,000	878,000	None
	96.71	5,043,700	2,644,200	100,000
	138.40	5,595,900	5,815,000	None
	23.00	580,000	771,000	None
Total for 1925 (14 companies).....	1,260.06	\$51,523,195	\$54,484,525	\$212,000

(1) Receiver appointed Feb. 28, 1925. Property sold at foreclosure sale and reorganized as Chicago, South Shore & South Bend Railway. Receiver discharged July 13.

(2) Information not available

(3) Receiver appointed late in December, 1924.

Table II—Record of Electric Railway Receiverships

Year	Number of Companies	Miles of Single Track Involved	Outstanding Securities—	
			Stock	Bonds
1909	22	558.00	\$29,962,200	\$22,325,000
1910	11	696.61	12,629,400	75,490,735
1911	19	518.90	29,533,450	38,973,293
1912	26	373.58	20,410,700	11,133,800
1913	18	342.84	31,006,900	47,272,200
1914	10	362.39	35,562,550	19,050,460
1915	27	1,152.10	40,298,050	39,372,375
1916	15	359.26	14,476,600	10,849,200
1917	21	1,177.32	33,918,725	33,778,400
1918	29	2,017.61	92,130,388	163,257,102
1919	48	3,781.12	321,239,354	312,915,104
1920	19	1,065.31	28,758,455	72,283,575
1921	19	986.42	32,909,525	36,177,800
1922	14	695.43	18,140,150	20,304,400
1923	12	333.63	8,332,100	14,707,066
1924	12	1,021.88	28,489,700	35,716,000
1925	14	1,260.07	51,383,195	54,696,525

(3) Receiver appointed late in December, 1924.

Table III—Record of Electric Railway Foreclosure Sales

Year	Number of Companies	Miles of Track Involved	Outstanding Securities—		Receivers' Certificates
			Stocks	Bonds	
1909	21	488.00	\$22,265,700	\$21,174,000	(a)
1910	22	724.36	19,106,613	26,374,075	(a)
1911	25	660.72	91,354,800	115,092,750	(a)
1912	18	267.18	14,197,300	10,685,250	(a)
1913	17	302.28	15,243,700	19,094,500	(a)
1914	11	181.26	26,239,700	44,094,241	(a)
1915	19	308.31	30,508,817	16,759,997	(a)
1916	19	430.14	13,895,400	22,702,300	(a)
1917	26	745.19	27,281,900	27,313,045	(a)
1918	23	524.22	37,740,325	20,149,384	(a)
1919	29	2,675.48	89,893,400	79,836,738	\$42,300
1920	13	259.90	7,782,400	11,227,328	52,000
1921	13	777.97	33,642,255	30,863,526	5,000
1922	13	322.88	7,491,500	12,640,600	114,683
1923	15	927.45	118,077,959	110,638,250	12,265,000
1924	14	869.25	21,022,800	34,845,535	3,440,388
1925	13	569.39	18,074,300	18,329,555	53,000

(a) Data not available.

Table IV—Electric Railway Receiverships as of Dec. 31, 1925

New England States	Year of Receiver-ship	Miles of Single Track	Outstanding Securities		Receivers' Certificates
CONNECTICUT			Capital Stock	Funded Debt	
Danbury & Bethel Street Ry., Danbury.....	1917	13.00	\$320,000	\$588,500	\$100,000
Hartford & Springfield Street Ry., Warehouse Point.....	1918	48.00	785,000	961,000	None
MASSACHUSETTS					
Boston & Worcester Street Ry., Framingham....	1925	83.00	2,482,200	2,520,000	None
Connecticut Valley Street Ry., Greenfield (1)....	1921	47.05	620,000	580,000	None
Millford, Attleboro & Woonsocket Street Ry., Springfield (2).....	1924	29.73	315,000	300,000	None
NEW HAMPSHIRE					
Laconia Street Ry., Laconia (3).....	1925	8.00	140,000	91,000	None
Portsmouth, Dover & York St. Ry., Portsmouth.	1917	12.00	.....	707,000	30,000
VERMONT					
Barre & Montpelier Traction & Power Co., Montpelier.....	1920	9.75	120,000	100,000	None
Net receiverships Dec. 31, 1925, 8 Cos.....		250.53	4,782,200	5,847,500	130,000
Eastern States					
DISTRICT OF COLUMBIA					
Washington-Virginia Ry.....	1923	40.00	2,378,300	5,614,000	None
MARYLAND					
Cumberland & Westernport Electric Ry., Frostburg.....	1925	25.00	625,000	655,000	None
NEW JERSEY					
North Jersey Rapid Transit Co., Hobokus.....	1912	18.00	800,000	800,000	None
Morris County Traction Co., Morristown.....	1923	68.98	300,000	4,179,000	None
NEW YORK					
Binghamton Ry., Binghamton.....	1925	49.52	978,895	2,812,825	None
Brooklyn Heights R.R., Brooklyn.....	1919	5.12	200,000	250,000	None
Buffalo & Lackawanna Traction Co., Buffalo....	1918	8.80	55,000	1,000,000	None
Hamburg Railway, Buffalo.....	1920	21.72	None	750,000	None
Hornell Traction Co., Hornell.....	1917	10.90	117,900	150,000	2,000
Long Island Electric Ry., Jackson Heights.....	1924	24.97	600,000	600,000	None
Ithaca Traction Corporation, Ithaca.....	1924	11.62	400,000	763,000	None
New York & Long Island Traction Co., Jackson Heights.....	1923	50.76	1,000,000	1,000,000	None
New York & Queens County Ry., Jackson Heights	1923	43.65	3,235,000	1,500,000	None
Manhattan & Queens Traction Corp., Long Island City.....	1917	21.66	20,000	25,946	None
Second Avenue R.R., New York.....	1908	26.35	1,862,000	5,720,000	3,140,000
Staten Island Midland Ry., New York.....	1920	28.68	1,000,000	1,000,000	3,000
Steinway Railway, New York.....	1922	31.11	None	1,500,000	None
Westchester Street R.R., New York.....	1920	16.32	700,000	168,000	None
Pean Yan & Lake Shore Ry., Pean Yan.....	1918	8.50	94,000	100,000	None
Ogdensburg Street Ry., Potsdam.....	1922	7.74	150,000	150,000	None
PENNSYLVANIA					
North Branch Transit Co., Bloomsburg.....	1915	30.00	500,000	532,500	45,000
Net receiverships Dec. 31, 1925, 21 Cos.....		549.40	15,016,095	29,270,271	3,190,000
Central States					
ILLINOIS					
Alton, Granite & St. Louis Traction Co., Alton....	1920	62.00	3,189,000	3,000,000	None
Chicago & Interurban Traction Co., Chicago.....	1922	50.00	1,000,000	1,816,000	None
Peoria Railway Terminal Co., Peoria (4).....	1922	25.28	1,000,000	2,444,000	None
INDIANA					
Union Traction Company of Indiana, Anderson..	1924	450.53	11,500,000	15,381,000	None
Ft. Wayne, Van Wert & Lima Traction Co., Ft. Wayne.....	1921	61.63	1,000,000	1,470,000	None
Indianapolis & Cincinnati Traction Co., Indianapolis.....	1925	101.00	3,600,000	2,400,000	112,000
KENTUCKY					
Owensboro City Railroad, Owensboro.....	1923	12.50	75,000	400,000	None
MICHIGAN					
Detroit United Ry., Detroit.....	1925	613.89	15,375,000	29,745,500	None
Grand Rapids, Holland & Chicago Ry., Jackson	1924	80.93	1,324,700	1,500,000	None
Houghton County Traction Co., Houghton.....	1921	32.15	957,200	660,000	None
Michigan Railroad, Jackson.....	1924	173.84	4,000,000	8,050,000	None
MINNESOTA					
Wahpeton-Breckenridge Street Ry. (7).....	1925	1.00	42,500	None	None
St. Paul Southern Electric Ry., Hastings.....	1918	17.54	658,225	425,400	None
Messaha Railway Co., Virginia (5).....	1924	38.00	2,260,000	1,581,000	10,000
MISSOURI					
Kansas City, Lawrence & Topeka Electric Ry., Kansas City.....	1919	12.00	250,000	400,000	None
Kansas City Railways, Kansas City.....	1920	318.04	100,000	29,959,316	None
Missouri Electric Railroad, St. Louis.....	1919	20.97	1,000,000	700,000	None
United Railways Company of St. Louis.....	1919	463.18	41,296,000	50,690,000	4,200,000
OHIO					
Cincinnati, Lawrenceburg & Aurora Electric Street R.R., Cincinnati.....	1913	31.67	808,900	750,000	None
Dayton, Springfield & Xenia Southern Ry., Dayton.....	1923	27.97	500,000	422,400	None
Cincinnati & Dayton Traction Co., Hamilton....	1920	91.07	1,250,000	3,250,000	None
Hocking-Sunday Creek Trac. Co., Nelsonville (6)	1923	14.99	223,000	300,000	None
Indiana, Columbus & Eastern Traction Co., Springfield.....	1921	201.49	4,025,000	7,900,000	200,000
Tiffin & Fostoria Ry., Tiffin.....	1925	15.00	(8)	(8)	(8)
Dayton, Covington & Piqua Traction Co., West Milton.....	1922	34.00	1,150,000	550,000	18,000
Net receiverships Dec. 31, 1925, 25 Cos....		2,950.67	96,584,525	163,794,616	4,540,000
Western States					
KANSAS					
Kanana City, Kaw Valley & Western Ry., Bonner Springs.....	1924	42.31	740,500	1,374,500	None
Joplin & Pittsburg Railway, Pittsburg.....	1924	94.52	7,000,000	3,078,500	None
MONTANA					
Helena Light & Railway Co., Helena.....	1925	18.50	935,000	878,000	None
OKLAHOMA					
Oklahoma Railway, Oklahoma City.....	1924	138.45	5,595,900	5,815,000	None
Tulsa Street Railway, Tulsa.....	1925	23.00	580,000	771,000	None
UTAH					
Salt Lake & Utah R.R., Salt Lake City.....	1925	96.71	5,043,700	2,644,200	100,000
Net receiverships Dec. 31, 1925, 6 Cos.....		413.49	19,895,100	15,561,200	100,000
Recapitulation for United States					
Net receiverships Dec. 31, 1925, 60 Cos.....		4,164.09	136,277,920	213,473,587	7,960,000

The passenger business on this road is small, but as a freight carrier it is of much importance in establishing through service.

The Columbus, Newark & Zanesville Traction Company, comprising 91 miles of track, was reorganized early in the year as the Southern Ohio Public Service Company.

Three small roads discontinued operation, receivers were discharged and the properties were dismantled. These were the Port Jervis Traction Company with a mileage of 4.78; the Alamance Railway, 8.40 miles, and the Charleston-Isle of Palms Traction Company, 9 miles; a total of 22 miles.

The New York Railways is shown as having terminated its receivership. This property was reorganized in 1924 and has been operated by the New York Railways Corporation for more than a year. Due to a technicality the receiver has not been formerly discharged by the court, but as the old company is no longer an operating company it has been shown as emerging from receivership.

A complete story of the rehabilitation of the Interstate Consolidated Street Railway, Attleboro, Mass., was published in the Aug. 29 issue of this paper, page 321. The Toledo & Western Railroad was purchased outright at foreclosure sale by the Toledo & Western Railway and is now being operated as an important part in the latter's transportation service. Only two railways in Florida were in receivership at the beginning of the year, The Jacksonville Traction Company and the Pensacola Electric Company. Both of these roads terminated their receiverships during the year and have been restored to their owners.

The mileage of roads going into receivership this year was greatly increased by the appointment of a receiver for the Detroit United Railway, about 614 miles of track being involved in this one. Operations of the property have been materially curtailed since the lines in Detroit were sold to the city some two years ago.

Two other roads of more than 100 miles went into receivership during the year. The Oklahoma Railway,

(1) Practically all the property has been liquidated but receiver not yet discharged.

(2) All the property has been sold and assets are being distributed. Receiver not yet discharged.

(3) Sold at foreclosure sale.

(4) Foreclosure sale advertised for Jan. 6, 1926.

(5) Receiver appointed March 7, 1924.

(6) Sold at foreclosure sale Dec. 4, 1925. Now under process of reorganization.

(7) Operations permanently abandoned.

(8) Information not available.

Table V—Receiverships Terminated and Foreclosure Sales During 1925

Receivers Discharged With or Without Foreclosure Sales or Following Abandonment	Miles of Single Track Involved	Outstanding Securities			Receivers' Certificates	
		Stocks	Bonds	Receivers' Certificates		
Interstate Consolidated Street Ry., Attleboro, Mass. (1)...	25.97	\$275,000	None	None	None	Sold at foreclosure sale in 1925 and reorganized as Interstate Street Railway
Northern Massachusetts Street Ry., Greenfield, Mass.	44.09	500,000	500,000	.....	.....	Property liquidated and receiver discharged Dec. 12
New York Railways, New York, N. Y.	85.01	17,495,060	48,673,027	.....	.....	
Port Jervis Traction Co., Port Jervis, N. Y.	4.78	30,000	70,000	None	None	Road has been dismantled.
Slate Belt Transit Co., Fen Argyl, Pa.	18.00	180,000	180,000	None	None	Reorganized and receiver discharged.
Fraakford, Tacony & Holmesburg St. Ry., Philadelphia, Pa.	16.18	500,000	400,000	None	None	Purchased and operated by the Philadelphia Rapid Transit Company.
Beech Grove Traction Co., Indianapolis, Ind.	3.90	150,000	100,000	None	None	Property sold at receiver's sale and reorganized as Beech Grove Traction Corporation.
Chicago, Lake Shore & South Bend R.R., Michigan City, Ind.	70.86	6,000,000	4,692,000	None	None	Sold at foreclosure sale and reorganized as Chicago, South Shore & South Bend R.R.
Maumee Valley Ry., Perrysburg, Ohio.	23.21	1,000,000	800,000	None	None	Receiver discharged
Ohio River Electric Railway & Power Co., Pomeroy, Ohio. ...	13.79	300,000	315,000	None	None	Property sold and reorganized as Ohio River Railway & Power Co.
Cleveland, Alliance & Mahoning Valley R.R., Ravenna, Ohio, 1920.	46.00	1,100,000	1,100,000	8,000	8,000	Purchased at receivers' sale by Northern Realty Co., a subsidiary of Northern Ohio Traction & Light Co., and operating as freight interurban.
Toledo & Western R.R., Toledo, Ohio.	89.00	2,000,000	2,000,000	None	None	Purchased by the Toledo & Western Railway at foreclosure sale.
Columbus, Newark & Zanesville Traction Co., Springfield, O.	91.05	2,025,000	4,704,000	190,000	190,000	Reorganized as the Southern Ohio Public Service Co.
Jacksonville Traction Co., Jacksonville, Fla.	60.00	1,500,000	3,267,000	128,791	128,791	Receiver discharged.
Pensacola Electric Co., Pensacola, Fla.	24.49	1,100,000	1,721,770	None	None	Purchased by Southeastern Power & Light Co. Receiver discharged Feb. 10.
Valdosta Street Ry., Valdosta, Ga.	5.00	50,000	1,500	\$383	\$383	Receiver discharged
Alamance Railway, Burlington, N. C.	8.40	60,000	120	None	None	Road has been dismantled.
Charleston-Isle of Palms Traction Co., Charleston, S. C.	9.00	527,000	250,000	None	None	Company liquidated and operations ceased.
Denver Tramway Co., Denver, Colo.	226.14	6,156,300	17,351,710	None	None	Receiver discharged and reorganized as Denver Tramway Corporation.
Total of receiverships terminated (19 companies)	864.87	\$40,948,360	\$86,126,127	\$319,174	\$319,174	
Foreclosures but Receivers Not Yet Discharged						
Laconia St. Ry., Laconia, N. H.	8.00	\$140,000	\$91,000	None	None	
North Branch Transit Co., Bloomsburg, Pa.	30.00	500,000	532,500	\$45,000	\$45,000	
Hocking-Sunday Creek Traction Co., Nelsonville, Ohio. ...	14.99	223,000	300,000	None	None	Foreclosure sale Dec. 4. Now being reorganized as Nelsonville-Athens Electric Ry.
Tiffin & Fostoria Ry., Tiffin, Ohio.	15.00	.....	.....	.....	.....	Information not available.
Total of foreclosure sales without receivers' discharge (4 companies)	67.99	\$863,000	\$923,500	\$45,000	\$45,000	
Foreclosures Without Receiverships in 1924						
Phoenixville-Valley Forge & Strafford Electric Ry., Phoenixville, Pa.	5.50	.....	.....	.....	.....	Information not available.
Mt. Manitou Park & Incline Ry., Colorado Springs, Colo.	1.25	130,000	125,575	None	None	
Gainesville Ry., Gainesville, Ga.	10.00	.....	.....	.....	.....	Service abandoned.

138.4 miles, and the Indianapolis & Cincinnati Traction Company, 101 miles. Next to these in importance are the Salt Lake & Utah Railroad, the Boston & Worcester Street Railway and the Chicago, Lake Shore & South Bend Railway, mentioned in a foregoing paragraph.

Next to the Detroit United Railway the largest properties remaining in receivership at the close of last year are the United Railways of St. Louis, with a total of 460.93 miles, and the Kansas City Railways, with 314.88 miles. Both of these companies are now in the process of reorganization. It was planned to sell the Kansas City property at foreclosure on Dec. 15 but it has been found necessary to postpone the sale until early this month. The reorganization plan has been approved by a large majority of the security holders and is acceptable to the court. The St. Louis company will undoubtedly perfect its reorganization plans and emerge from receivership during this year.

Super-Highway Plan Progressing in Detroit

POPULAR attention was vividly attracted to a suggestion made by the Detroit Rapid Transit Commission, a little more than a year ago for the construction of a system of super-highways, each 212 ft. wide and extending from Detroit radially in a number of directions. The plan was described on page 52 of the issue of this paper for July 12, 1924. Recently two more reports bearing on this subject, but relating more particularly to means for expediting traffic downtown, have been presented to the city authorities. One of these was an analysis of traffic conditions on a number of Detroit business streets made by the Rapid Transit

Commission. The other was a report entitled "Carrying Out the Master Plan" by an advisory committee, made up of the corporation counsel, the prosecuting attorney of Wayne County, the Board of County Auditors, the City Plan Commission and the Rapid Transit Commission.

The former report summarizes the traffic conditions of the Grand Boulevard and streets leading to it on June 19, 1925, for a period of twelve hours from 7 a.m. to 7 p.m. The Grand Boulevard belts the city at a distance of about 3 miles from the center and is 11 miles long. Everywhere it is 150 ft. wide and in some places 200 ft. wide, and the Rapid Transit Commission says that it is an example of far-visioned city planning that may well serve as an inspiration to those responsible for the present planning of the city of the future. It has now come to be one of the most used traffic arteries of the city, articulating as it does with all the radial avenues which are characteristic of the city plan of Detroit.

It is found that at times the movement of traffic on the Boulevard amounts to 679 vehicles per traffic lane. This number is near the point of saturation, which is believed to be 800 vehicles per traffic lane under the present "Stop and Go" regulations. To improve conditions, the commission recommends the widening of a number of streets and opening of others, the most important being the development of Vernor Highway to be 150 ft. wide at points and 120 ft. wide at other points, extending north and south through the city, at a cost of \$5,279,000.

The report of the advisory committee approved this plan and discussed the legislation necessary and the cost for this and other proposed improvements.

The News of the Industry

Seven-Cent Ticket Rate in Spokane

Application for a 10-cent cash and a 7-cent ticket fare to become effective on Feb. 1, 1926, was filed by the Spokane United Railways, Spokane, Wash., on Dec. 28. Unless a protest is made the fare will become effective automatically. The company had petitioned for a 10-cent cash fare, with a ticket rate of thirteen for \$1 or 7.69 cents each. Under the new tariff filed five tickets would be sold for 35 cents. State officials indicated that the Spokane United Railways management and the City Council of Spokane had reached an agreement on this rate.

Formal notice was filed on Oct. 16 with the Mayor and the City Commissioners of Spokane to the effect that the Spokane United Railways intended filing a schedule for increased rates with the Department of Public Works of the State of Washington calling for a 10-cent cash fare, a 7.69-cent ticket rate and with school tickets remaining at 4 cents. Stern opposition to the proposed increase was voiced by Charles A. Fleming, Mayor and Commissioner of Public Utilities of the city, in his report to the City Council on Nov. 5. The present rate is 7 cents cash with a 6-cent ticket rate.

Ordinance Looks Toward Cleveland Subway

Petitions for an initiated ordinance, to float a \$30,000,000 bond issue for subways in Cleveland, are in circulation. The movement was started by Councilman Peter Witt, formerly city street railway commissioner. Five thousand signatures are needed to put the ordinance before the City Council. The petition calls for three lines, one across Superior Avenue from the easterly limits of the city, via the high level bridge and Clifton Avenue on the west side; a second running westerly from Cedar Avenue and East Boulevard, on the east side, to University Circle, west on Euclid to Huron Road and over the proposed Huron-Lorain bridge to West 35th Street, and a third northerly from East 93d Street and Miles Avenue, to Buckeye Road and northwesterly to Woodland Avenue and to the Public Square. Mr. Witt's idea is to pay off the bonds in 25 years and to have them bear 6 per cent interest.

Mayor Signs \$1,200,000 Offer for Rainier Line

Mayor Edwin J. Brown recently signed the ordinance passed by the City Council of Seattle, Wash., binding itself to an offer of \$1,200,000 for the lines of the Seattle & Rainier Valley Railway. Immediately a referendum move was started to put the deal to a vote of

the citizens of Seattle. Petitions for such a referendum have been circulated by those residents of Rainier Valley who oppose the purchase. As a counter-move, residents of the valley who favor the purchase, and who claim to be 98 per cent of the residents, issued post-cards to all Seattle voters urging against the referendum and requesting voters not to sign the petition.

The card points out that "purchase will give the city monopoly of street railway transportation, assuring valley residents equal rights and privileges with the rest of the city." The campaign for referendum is headed by E. F. Blaine, former chairman of the State Public Service Commission, aided by E. F. Markham, president of the Rainier Valley Commercial Club.

Pay of Connecticut Men Unchanged

Arbitrators Continue Base Rate at 60 Cents, but Increase Bus Men
3 Cents—Shop Men Benefited—Minority Report to Be Filed
—Company Sought Reduction

THERE will be no increase in pay for trainmen of the Connecticut Company, New Haven, but 3 cents additional an hour has been awarded to bus operators. This establishes a differential of 10 cents an hour for bus operators over the basic rate of 60 cents an hour, instead of the present 7-cent differential. It represents the finding of the board of arbitration, concurred in by the neutral arbitrator and the arbitrator for the company. The member of the board chosen by the men dissented. The finding was made public on Dec. 22.

The request of the men that the right of seniority be extended to include the operation of buses was denied by the board on the grounds that "it would result in great injustice to the present motor bus operators if their right to maintain their present jobs should be taken away . . ." and further that "the offer of the company to extend the right of seniority to the trolley operators in all cases where any vacancy hereafter occurs in existing bus lines and to all new buses hereafter put in operation, is an eminently just and fair one and is hereby sustained."

OTHER SLIGHT CHANGES

The award of the board effected another slight change in wages, concerning only about twenty men, in that it established that all shop and power station employees, some of whom are now receiving less pay than others for the same work, should be paid an equal wage and that this should be the highest rate now paid by the company in these various lines.

An unusual feature of the award is that the bus operators, receiving the only wage increase, made no demand for a rate of pay higher than the one-man trolley operators. About 100 bus operators are affected by the increase and with the retroactive provision they will receive approximately \$50 each in back pay.

As set forth in the award the present rates of pay to trolley men are as follows: 53 cents an hour for the first

three months of employment; 56 cents an hour for the next nine months, and thereafter 60 cents an hour as the general basic rate, plus a differential rate of 7 cents an hour for operators of one-man cars and buses.

The demands of the men were that these rates be increased to 70 cents in the first instance; to 72 cents in the second and 75 cents in the third, the basic rate. They demanded that the differential rate for one-man car and bus operators be made 15 cents above the basic rate.

The Connecticut Company sought to reduce the wage scale to 47 cents in the first instance, to 51 in the second and to 55 in the third or basic rate. The company asked for a reduction of the differential rate to 5 cents above the basic rate.

In reviewing the claims of each side the arbitration board found that the men claimed there had been a shortage or "lag" in pay over a period of twelve years and that the rate should be increased so this amount would be made up over the same period of time. The Connecticut Company claimed there should be a reduction in the future because of the "excess" of actual earnings now over the cost of living during the same period.

The board held that neither claim was valid because of arbitration agreements covering the years from 1921 to 1925, which precluded bringing up such questions again, the legal theory of arbitration being that the disposition of its subject matter is final.

The decision was written by Charles Kleiner of New Haven, neutral member and chairman of the arbitration board which included Joseph F. Berry, Hartford, representing the Connecticut Company, and James H. Vahey, Boston, representing the union. Mr. Berry added his signature to the finding which was signed by Mr. Kleiner, and the award with its requirement of two signatures becomes final.

Mr. Vahey did not sign the finding. It is expected that he will file a minority decision.

"We Are"—"Will You" Slogan in Allentown

The Lehigh Valley Transit Company, Allentown, Pa., is conducting an intensive safety campaign through its general safety committee. The members of the committee are visiting personally all owners and operators of trucks in the territory of 218 miles of track traversed by the company and are talking to people on the street corners and in the cars. The members of the committee are designated by an arm band with large green letters, "General Safety Committee L. V. T. Co." Talks have been given before all the luncheon, civic and woman's clubs in the entire district. Newspaper articles have appeared periodically. Mass meetings of the men have been held, with addresses by the mayors and other officials of the various cities.

At the mass meeting of the men held on Dec. 18 in the assembly hall of the company four prizes were awarded for the best safety suggestions brought in by the men. One of the prizes was awarded for a slogan which will be adopted by the company and used on the cars of the company after the first of the year. The slogan is as follows:

WE ARE
WILL YOU

?

ASK THE
MOTORMAN OR CONDUCTOR

All employees will wear buttons with this slogan on it, "the object being, we are working to safeguard the highways, will you co-operate with us?" Another prize was awarded for a poem entitled "The Head-Gear." This was composed by one of the conductors. This poem is appearing in the newspapers over the entire system of the company.

The drive has been one of the most successful and the most interesting that has ever been conducted by the company. It is under the direct supervision of H. F. Dicke, vice-president and general manager, and E. C. Spring, general superintendent.

Key System Passengers Questioned About Riding Habits

In an effort to solve two transportation problems affecting the East Bay cities of California the State Railroad Commission has drawn up a questionnaire for passengers traveling to and from Oakland and San Francisco on ferryboats of the Key System Transit Company and the Southern Pacific Company.

It is hoped that the answers to this questionnaire will shed light on the contention of the Key company officials, who are seeking increased ferry and car fares, that the fares now being collected are too low for the average trip mileage and that they also will answer the question as to whether the Key company is over supplied with ferryboats.

Four questions are being put to ferry passengers:

1. Is this a single trip or are you traveling upon commute or free ticket?

2. At which street or station do you leave the train?

3. After leaving the train what is your immediate destination and that is near the intersection of what street?

4. If you use a street car to complete your trip, what is the number or letter of the route used?

Since the Key company ordered two new ferryboats built recently the contention has been raised that the company does not need them, that it already has too many boats and that it maintains an uneconomical service throughout the day, with the result reflected in the net revenues and a demand for higher ferry fares.

To this Key company officials have replied that some of their old boats now in service cost so much to maintain that it has been deemed an economy to buy new ones to replace them.

Making the Punishment Fit the Crime

Drivers of motor vehicles in Buffalo, N. Y., who approach within 7 ft. of a standing street car are being arrested for violation of the traffic ordinances as the result of a campaign started by the Buffalo Courier, a newspaper, with the co-operation of the police department and the International Railway. The railway reproduced a cartoon published in the Courier showing the 7-ft. safety zone around standing street cars and these were displayed on cards attached to the front and rear ends of every street car in the city. Fines have been imposed upon several hundred motorists in this campaign, with the result that accidents resulting from drivers injuring passengers boarding and alighting have been materially reduced.

COMING MEETINGS

OF

Electric Railway and Allied Associations

Jan. 6—American Society of Civil Engineers, Engineering Societies Building, 29 West 39th Street, New York, N. Y.

Jan. 8—Metropolitan Section A. E. R. A., Engineering Societies Building, 29 West 39th Street, New York, N. Y., 8 p.m.; Informal dinner, Keen's Chop House, 72 West 36th Street, 6:15 p.m.

Jan. 14-15—Kentucky Association of Public Utilities, Annual Meeting, Brown Hotel, Louisville, Ky.

Jan. 20-21—Central Electric Traffic Association, Miami Hotel, Dayton, Ohio.

Jan. 22-23—Central Electric Railway Accountants' Association, Miami Hotel, Dayton, Ohio.

Jan. 26-29—Society of Automotive Engineers, Annual Meeting, Detroit, Mich.

Jan. 27—New York Electric Railway Association, Hotel Commodore, New York, N. Y.

Jan. 28-29—Central Electric Railway Association, Lincoln Hotel, Indianapolis, Ind.

Feb. 11—Central Electric Railway Master Mechanics' Association, Portage Hotel, Akron, Ohio.

April 13-16—Southwestern Public Service Association, Galveston, Tex.

\$12,000,000 Electrification for Long Island

Vice-President Le Boutillier of the Long Island Railroad on Dec. 24 laid plans before Chief Engineer Randolph Nixon of the Public Service Commission for further electrification of the Long Island from 1926 to 1929 at a cost of \$12,600,000.

The improvements follow:

In 1926, electrification of the Bay Ridge Division and the Bay Ridge yards, \$1,040,000.

In 1927, electrification of the Montauk Division, from Long Island City to Holban yards and the yards at Long Island City, Blissville, Fresh Pond and Holban, \$6,010,000.

In 1928, electrification of freight sidings on the North Side Division, the main line between Long Island City and Jamaica and on the Atlantic Division, \$1,205,000.

In 1929, electrification of the remainder of freight sidings in territory now electrified for passenger service, \$595,000.

With the exception of \$710,000 in 1926 for seven electric locomotives for electrification of the Floral Park-Mineola extension from Hempstead Crossing to Valley Stream, Mr. Le Boutillier said the proposed expenditures have to do with freight lines only.

Wage Increase on Illinois Traction

A flat wage increase of 5 cents an hour, an increase of $\frac{1}{2}$ cent in the mileage rate and 50 per cent increase in overtime with the provision that the present closed shop be maintained, are the terms of the new agreement between the Illinois Traction System and its trainmen. Under the new schedule the pay of motormen, conductors and brakemen will be from 55 to 70 cents an hour. The old agreement expired on Nov. 30, but the men continued at work pending an adjustment. Their contract provides that there shall be no interruption of service while negotiations on a new contract are under way. It is understood that the wage settlement applies only to the main line of the Illinois Traction System, which is exclusive of what is known as the Illinois Valley Division, which runs from Ottawa west.

On the Air with P.R.T.

After the Philadelphia captain of industry, his day at the office finished, has donned the old carpet slippers and stoked up the favorite pipe he can now tune in on station WLIT and hear the versatile artists of the Philadelphia Rapid Transit Company in action. Even to these lengths have the efforts toward building up a lasting spirit of public good will gone.

With the installation of a radio control room at its carhouse at Tenth and Luzerne Streets the P. R. T. made its opening bow to the radio public on Dec. 2. An unusually well-rounded program was given, over a period of two hours, by the P. R. T. Brass Band of 110 pieces, one of the largest industrial bands in the country; the P. R. T. String Club, of 25 instruments; the Tempert Serenaders, a twelve-piece jazz orchestra which has made quite a name for itself in playing for various dances of the employees, and a mixed quartet. It is planned to continue the concerts on alternate Wednesday evenings.

Construction Work in Buffalo Ordered

The Public Service Commission under an order issued on Dec. 28 directs the International Railway, Buffalo, N. Y., as follows:

On or before July 1, 1926, to complete reconstruction of its tracks in Grant Street.
On or before Sept. 1, 1926, to complete reconstruction of its tracks in Walden Avenue from the east side of Genesee Street to the New York Central Railroad undercrossing.

On or before Nov. 1, 1926, to complete reconstruction of its tracks in Walden Avenue from the Erie Railroad undercrossing to the Delaware, Lackawanna & Western Railroad undercrossing.

The city, under a complaint filed, asked for an order to compel the railway to reconstruct the pavement in Main Street from Hertel Avenue to the city line and in Walden Avenue and Grant Street, it having entered into contracts for repavements, and had notified the railway to repave between and for 2 ft. outside its tracks. Commissioner Pooley, the sitting commissioner, in a memorandum approved by the commission, says the commission is not concerned with the question of repavement, that being governed by law requiring the railway to keep in permanent repair that part of the street occupied by it, and in case of neglect by the company the city can do the work at the expense of the company.

The commission says:

We are concerned, however, with regard to the manner in which street car lines are conducted and operated and with respect to adequacy, security and accommodations afforded by their service, and the scope of this investigation has been confined to a consideration of the safety of the tracks in question with respect to transportation of passengers.

Last Staten Island Line Electrified

The Staten Island Rapid Transit Company completed on Dec. 24 the electrification of its passenger train service. On Dec. 25 it operated its first electric train over the north shore division from St. George to Arlington.

Operations over the electrified system were initiated by General Superintendent M. L. McElheny. Officials of the company made the first trip. The new electric trains will reduce by four minutes the running time over the north shore division. The only steam locomotives still in operation by the company will be used to haul freight.

\$98,000 Asked for Preparatory Work for Pittsburgh Subway

The recently created Department of Rapid Transit of Pittsburgh, Pa., has requested the City Council for twenty new positions with salaries totaling \$60,884 annually. Besides, the department has asked for \$13,116 for general expenses and special services and \$24,000 for consulting engineer's fees and expenses. The appropriation request for next year aggregated \$98,000. The Rapid Transit Department was created to supervise all city-owned transportation facilities, particularly the proposed \$6,000,000 subway. Officials of the department, appointed last September, all serve without pay. A letter which accompanied the request for the appropriation said the estimates were based

on the assumption that the Council, as a result of recommendations of the Traffic Commission, would take action soon to authorize subway construction.

Increase in Fare Asked in Shreveport

A petition for a change in rates for Shreveport, La., has been filed with the Louisiana Public Service Commission by the Shreveport Railways. The petition is an amendment to an original petition asking an 8-cent fare with a 4-cent fare for children.

The new rate asked is a straight fare of 7 cents for adults and 3½ cents for school children. The present rate is 7 cents cash fare, four tickets for 25 cents or seventeen for \$1. School children pay a 2½-cent fare.

Capt. H. B. Hearn, president of the Shreveport Railways, announced that the company plans to increase service and to make other improvements.

Receiver Confident St. Louis Will Be Just

Rolla Wells, receiver for the United Railways, St. Louis, Mo., in a series of addresses to the employees in recent weeks, has expressed the belief that the public of the city will receive favorably an application from the company for a new franchise with a rate of fare sufficiently high to compensate capital for investing in the railway.

He has pointed out that the reorganization plan is fair to the public and that the public in turn should be fair to the investors in the railway's securities. In this connection he pointed out that the stockholders of the United Railways have not had a dividend in years and that it is manifestly unfair to ask the man who by his investment provides railway facilities to serve the public without pay.

In conclusion he expressed the belief that the changed attitude on the part of patrons, press and city officials toward the United Railways will result in the enactment of a franchise which will make possible the best railway service St. Louis has had in years.

News Notes

Traction Employee to Be Tried.—The trial of Harry H. Hershey, charged with embezzlement of \$41,000 from three utility companies of Lancaster, Pa., will be held in the January term of court. Mr. Hershey was an employee of the accounting department of the Conestoga Traction Company.

Affirms Old Order.—The Public Service Commission on Dec. 28 affirmed its order made in January, 1925, in the matter of the operation of one-man cars by the International Railway in Buffalo. The order which dismissed the complaint of the city of Buffalo against the use of one-man cars and suggested supplemental rules for safety was reviewed in the *ELECTRIC RAILWAY JOURNAL* of Jan. 17, page 116.

Christmas Bonus Awarded at Nashville.—The management of the Nashville Railway & Light Company, Nashville, Tenn., played Santa Claus to its employees recently by distributing \$3,240 in bonuses to men who have led the field in safe operation during the past three months. This amount made the year's total given to operating employees \$11,222. Sharing this gift were 119 motormen and operators who had operated three months without an accident. They had attended every safety meeting held by the company. With them were 107 conductors.

Fares Advanced at Joplin.—The City Commission of Joplin, Mo., on Dec. 22 adopted a resolution to grant the Joplin & Pittsburg Railway an increase in street car and bus fares from 5 to 7½ cents. The new rate will be in effect during a trial period of six months, starting on Jan. 1. The proposal for increased fares was made by a committee of the Chamber of Commerce after it had studied the local transportation problems.

Fare Lowered.—The Public Utilities Commission of the District of Columbia has authorized the Capital Traction Company, Washington, D. C., to reduce the rate of fare on its Chevy Chase Loop bus line to 5 cents, with twenty tickets to be sold for \$1. No transfer privileges will be extended to the users of this ticket.

Short Time Grant Sought.—Negotiations looking toward a short-time franchise for the Canton-Akron interurban line of the Northern Ohio Traction & Light Company have been started by A. C. Blinn, general manager. He asked the county for permission to operate without a franchise until 1927. The commissioners refused the request and declared they would give the company until Jan. 11 to obtain consent of a majority of the property owners for a renewal of the franchise. Mr. Blinn agreed to accept a new franchise if it specifically stated operation could be abandoned any time at the discretion of the management.

Wages Advanced Five Cents.—Employees of the Jacksonville Traction Company, Jacksonville, Fla., have received a pay increase of 5 cents an hour effective on Jan. 1. This increase is in addition to the 3 cents an hour granted in September. J. P. Ingle, general manager of the company, in announcing the boost said that the total of 8 cents over the 1925 scale would amount to \$70,000 during 1926. Mr. Ingle said the increase was decided on as the result of the increased living costs in Florida. It will result in the average trainman of the company receiving approximately \$165 per month.

Polite System Introduced.—The Arkansas Central Power Company, Little Rock, Ark., has put its employees under the polite code, with a card bearing the car operator's name placed above the motorman's station. Superintendent Koonce is responsible for this innovation. He says banks and business houses find it a good way to establish better relations between their employees and the public. He believes that the men like the plan and show a pride in the representation given them.

Recent Bus Developments

Buses Authorized in Columbia

The dawn of the new year in Columbia, S. C., will see in operation a fleet of ten 29-passenger White buses of the "pay-as-you-enter" city type, a certificate for operation having been granted the Carolina Transit Company of Columbia, S. C., by Samuel McGowan, chief highway commissioner.

Ten buses will operate over five routes and will provide transportation facilities to sections of Columbia not now served by the street car system of the Columbia Railway, Gas & Electric Company. Suburbs will also be served and one town, New Brookland, across the Congaree River from Columbia. Ten-cent fares will be charged with 5-cent fares for school children and three tickets or tokens will be sold for 25 cents.

The granting of the certificate to operate came after negotiations which had been somewhat protracted. The transportation situation in Columbia has been much in the public eye in recent months, three factors being involved, the 10-cent jitneys, the street cars and the bus lines. The various stages in the controversy have been referred to in these pages.

After holding the application for the permit in abeyance for some time, during which efforts were made to find out what the people of the city wanted, the highway commissioner granted the petition for a certificate to operate. A number of communications were directed to the commissioner, practically all of these favoring the operation of the buses, and so the application was granted. In the meanwhile, the 10-cent jitneys continue their operations, though the City Council at a recent meeting passed an ordinance which gives it power of regulating the jitneys to operate on certain streets, should it deem such action advisable. The jitneys at present run anywhere they like, carry only white passengers and charge 10-cent fares.

Buses in Newton

Buses will take the place of railway cars in the town of Newton, Mass., and in those adjacent towns that are served by the Middlesex & Boston Street Railway. In a recent all-night special session the Newton Board of Aldermen granted the company an exclusive franchise for the operation of buses. Within 60 days the cross-town and Bemis lines of trolleys are to be replaced by buses. The cross-town cars run from Newton to Waltham and the Bemis line runs between Newton and Waltham.

Another line from Lake Street to Newton Highlands, via Newton Center, and to Watertown and Needham, will be motorized by Oct. 26, 1926, or by January, 1927, at the latest. Extra service is to be required of the company as soon as these three lines are provided with buses. The company asked for a subsidy of \$10,000 from the town,

but this subsidy was refused by the Aldermen. Only two lines of street cars will be left when the new buses are in operation.

Bus Lines in Jamestown to Suspend

Notice that it intends to discontinue bus service on all lines in Jamestown, N. Y., in the near future was served upon the City Council on Dec. 22 by the Jamestown Motor Bus Transportation Company. There was no open session discussion of the proposal to abandon the bus lines by the Council, but that body voted to have a special committee of five men make a general survey of the bus situation, as well as the proposal of the Chautauqua Traction Company to abandon its line between Ashville and Mayville and of the Lake Erie Motor Coach Lines' request for permission to operate buses between Jamestown and Buffalo.

The owners concluded:

1. That even without considering anything for depreciation, the expense of operating the Jamestown Motor Bus Corporation is greater than its revenue. In other words, the buses have not paid the actual cash outlay necessary from day to day to keep them going.

2. That during approximately four years of operation the entire investment of \$50,000 in buses has been wiped out by depreciation and the company has been unable to earn any reserve to make the depreciation good.

W. A. Broadhead of the railway said:

We are faced with this problem, shall we now put into the company enough additional capital (at least \$30,000) to purchase six new buses? Not only is there no prospect that we would earn any return on the money so invested, but it appears that the entire investment would be wiped out by the rapid depreciation against which no reserve could be earned.

The deficit incurred in the last sixteen months is \$12,738. It would be nothing short of fool-hardy to make a new investment in this kind of business.

The officers of this company are not unappreciative of the importance of this transportation in the development of the city. These conclusions are reached with regret but they are cold facts which face us when the demand for more money for new equipment is made.

At a time in the near future when use of the present equipment becomes impracticable this company will be obliged to discontinue its operations. That date we have not fixed yet but it will not be long deferred.

Pending the fixing of such date we will be glad to have you examine the auditors' statements in detail and give the transportation problem your careful consideration, and we will be glad to furnish you any information which will be of service to you.

Some four years ago the Jamestown Motor Bus Corporation engaged in the operation of a bus service under a franchise from the city of Jamestown. The decision to stop operation is understood to have been based on an examination made by the administrators of the estates of Sheldon B. Broadhead and Almet N. Broadhead, who had financed the operation. The Broadheads control both the Jamestown Street Railway and the Chautauqua Traction Company.

Service at Cost Suggested for Washington Buses

F. W. Doolittle, vice-president of the North American Company, which has taken over the routes of the Washington Rapid Transit Company, operating buses in Washington, D. C., wants rates fixed to provide a limited return on a fixed valuation, with the surplus devoted to extending bus facilities. Mr. Doolittle wants the bus properties valued by the Public Utilities Commission and a reasonable return on that valuation allowed in the fixing of fares. The return in the case of other public utilities in the District is 7½ per cent. Over and above this Mr. Doolittle would put the profits into cutting fares and improving service. Mr. Doolittle said:

The company's Sixteenth Street line is paying well. This should not be taken as an indication of the profitability of bus operation under existing rates of fare, as adequate service to the community will require transportation routes upon which the same density of business cannot be expected to develop.

It is intended to apply to the commission to prescribe a service-at-cost procedure, by which the returns the company will be permitted to earn will be definitely understood, this plan to provide that excess earnings be utilized for extensions of service or reductions in fares.

Alexander Shapiro of the Milwaukee Electric Railway & Light Company, controlled by the North American Company, has been sent to Washington to study the present bus system.

Oklahoma City Bus Lines Create New Business

The bus lines recently established by the Oklahoma Railway, in Oklahoma City, to supplement street car service are actually creating new business for the company. The North Hudson and Walker bus line established several weeks ago is already making money for the company. A new line, to be known as the Blackwelder line, has been established to run from the terminal and down-town shopping district northwesterly to and beyond the Oklahoma City University. The receipts on this line are encouraging. According to the receivers many automobile owners who have not heretofore patronized the street cars are riding these buses because by so doing they eliminate parking problems and are carried direct to the retail center of the city at less cost.

Bus Company in Napa Formed

Articles of incorporation of the Napa Valley Bus Company, a subsidiary of the San Francisco, Napa & Calistoga Railway, Napa, Cal., were filed recently and the new company has applied to the State Railroad Commission for a permit to operate an auto stage line through the Napa Valley between Vallejo and Calistoga.

It will be necessary for the electric railway to take off some of its trains in the near future owing to a decrease in traffic, it is stated, and it is the intention of the railroad to fill any such vacancies in its schedule with the motor stages. The buses will be used for passenger service only, and the passengers' baggage, which may be checked on their ticket, will follow later on an electric train.

Bus Service Enlarged.—The New York, New Haven & Hartford Railroad has been given authority by the Public Utilities Department of Massachusetts to operate a bus line between the towns of South Braintree and North Easton, the route passing through Braintree, Randolph, Stoughton, Easton and into North Easton. At the same time the company was authorized to operate buses from North Easton to Canton, passing through Easton, Stoughton and Canton. The town of Needham voted, in town meeting, to instruct its Board of Selectmen to grant the New Haven Railroad a license to run buses through the town on the way from Needham Junction to Newton Highlands, and it is expected that this service will be started immediately.

Buses in Erie.—The Erie Coach Company, a subsidiary of the Erie Railways, Erie, Pa., is operating four 29-passenger Yellow buses over a route of 3 miles at a 10-cent fare. Some time ago A. R. Myers, president of the company, said that he was prepared to operate a bus line from the West Lake Road over the new state highway leading to the Erie Peninsula if the necessity existed for such travel.

Bus Lines to Pay \$200.—Under the terms of a new ordinance adopted by the Common Council of Neenah, Wis., effective Jan. 1, 1926, bus lines operating in the city will be required to pay a license fee of \$200 instead of \$50 for each bus operated as the share of the growing cost of maintenance of streets. Several of the Councilmen favored raising the fee to \$500 a year for each bus, but it was felt that in a test case the courts might hold this fee unreasonable.

New P. R. T. Line Started.—The Philadelphia Rural Transit Company, a subsidiary of the Philadelphia Rapid Transit Company, Philadelphia, Pa., has added a new bus route to its city-wide system. The new route, authorized by the Council and approved by the Public Service Commission, was planned to increase transportation facility along the Delaware riverfront. The route will provide transportation along the port of Philadelphia, particularly for workers of the industries located there. The standard single-deck gas-electric buses are being operated. The fare is 10 cents with 3-cent exchanges to all connecting lines.

Bus Line at Cincinnati Bought.—The Cincinnati Street Railway, Cincinnati, Ohio, has bought from Dale McKay the bus line which he has been operating between Mariemont and Oakley. The purchase is subject to approval by the Ohio State Public Utilities Commission, which will hold a hearing at Columbus Jan. 19. At the same time the commission will hear an application of the railway to increase the equipment and service of the bus line from three to nine buses and to extend the line from Oakley to Government Square. The Cincinnati Street Railway proposes to run buses twenty minutes apart from 6 a.m. to midnight. In the event the sale is approved by the commission, it will mark the first transaction of its kind since the railway announced its decision to enter the bus field.

Financial and Corporate

Deficit Piles Up Under City Operation

Thirty-Mile Road on Staten Island Lost \$503,768 in Five Years Under Hylan

The Staten Island Midland Railway, operated by the city authorities of New York, piled up for the fiscal year ended June 30, 1925, the largest deficit for any similar period of the five years of municipal operation. The road went behind \$103,595, exclusive of any interest or depreciation charges. These figures were derived from the annual and monthly reports of the Department of Plant and Structures made to the Transit Commission.

As the road carried 9,112,421 passengers in the year, the deficit was 1.14 cents per passenger. In other words, the passenger paid a 5-cent fare and the city paid the deficit in the cost of his ride out of taxes.

The Staten Island Midland Road went into receivership, stopped operation and was finally taken over by the city under lease five years ago as an experiment in municipal operation. In no year within this period has the city taken in enough to pay all the expenses.

1.69 CENTS LOST PER PASSENGER

If the sum of \$50,000, the interest at 5 per cent on the \$1,000,000 of first mortgage 5 per cent bonds of the railroad, were included in the results of operation, as they would have to be if the road paid its own way, it would increase the deficit to 1.69 cents per passenger. For the first seven months of operation, 1920-1921, the deficit was at the rate of 0.8 cents per passenger; for the fiscal year 1922, 0.61 cents per passenger; for the fiscal year 1923, 0.39 cents per passenger; for the fiscal year 1924, 0.93 cents per passenger, and including the 1925 deficit, an average of 0.7 cents per passenger over the whole period of municipal operation.

During the period from Dec. 1, 1920, to June 30, 1925, 38,961,517 revenue passengers were carried. The total deficit from operation for this period was reported as \$274,602. The addition of the interest of \$50,000 annually on the bonds of the company would increase the deficit over the entire period to \$503,768, or a deficit over the whole period of 1.29 cents per revenue passenger.

Other items would tend to make the actual deficit even greater. No provision has been made for depreciation during the last three years, either on the equipment purchased by the city or on the property taken over from the Staten Island Midland Railway. Prior to 1923 only \$21,530 was set aside for depreciation. In addition, certain rehabilitation work amounting to \$163,644 has been charged to capital as recoverable from the receiver of the Staten Island Midland Railway. Ordinarily, part of this amount would be charged against operating expenses

and thus further increase the deficit, but in this instance, under the agreement with the railroad, it has been entirely excluded from operating expenses.

The latest report of operations of the Staten Island Midland on file with the Transit Commission is for the month of November, 1925. The deficit for this month is \$20,311, compared with \$9,407, in November, 1923, and \$6,584.24 in November, 1924.

Net Earnings Up in Baltimore

The United Railways & Electric Company, Baltimore, carried 204,341,300 revenue passengers from Jan. 1 to Nov. 30, inclusive. This figure compares with 209,082,005 for the corresponding period of 1924. The number of revenue passengers in November, 1925, was 18,718,923, an increase over November, 1924, when the figure was 18,274,054. The decrease in the total for the eleven-month period is largely due to the extension of fare zones which took place in 1925.

The passenger revenue during the eleven months of 1925 was \$14,948,867, an increase of \$128,166 over the similar period of 1924. The revenue from this source during the past November was \$1,369,348, an increase of \$28,951 over the previous November.

Total revenues for the first eleven months were \$15,147,802, an increase of \$132,502. Total revenues for the past November were \$1,387,566, an increase of \$31,246.

Net income for the first eleven months was \$796,531, an increase of \$36,156, or 4.76 per cent, over the similar period of 1924. The net income for November, 1925, was \$91,796, an increase of \$449 over November, 1924.

Sale Under Foreclosure at Kansas City Set for Jan. 4

Announcement of the postponement of the sale of the property of the Kansas City Railways, Kansas City, Mo., from Dec. 14 to Jan. 4 was made by John T. Harding, special master and commissioner in charge of the sale, after P. C. Groner, William G. Woolfolk, and A. J. Higgins, representing the Newman interests, had requested that additional time be given them because they believed they would be enabled to have the remaining first mortgage bonds and notes deposited with the reorganization committee. Before making the announcement, Mr. Harding made several futile attempts to reach Judge Kimbrough Stone of the federal court, referee, who was in St. Louis at the time.

On the day set originally for the sale, it was said 96 per cent of the first mortgage bonds and notes were on deposit with the reorganization committee headed by the Newman-Woolfolk interests, which are expected to bid in the railway.

Interborough Deficit Reduced

New York Company Which Transported 1,089,544,225 Passengers Last Year Shows Slight Gain in Net

Gross operating revenue of the Interborough Rapid Transit Company for the fiscal year 1924-1925, made public on Dec. 23, increased \$645,215 compared with the fiscal year ended June 30, 1924. Non-operating income, however, was \$110,562 less than during the previous year, making the net increase in revenue from all sources for the year \$534,653.

OPERATING EXPENSES REDUCED

Total operating expenses, including actual maintenance expenditures in excess of contractual provisions, were \$690,936 less than in the preceding year. These gains were offset, however, by increase of \$536,060 in taxes and increase of \$676,012 in allowances for income deductions. The net result for the year was a deficit of \$345,508 after allowance for all expenditures and income deductions. This is \$13,517 less than the deficit reported for the previous year.

There was an increase in the number of passengers carried for the fiscal year in question. This figure reached a total of 1,089,544,225 compared with 1,074,343,243 for the preceding year. The increase was 15,200,982—the net result of a subway gain and an elevated loss. On the subject of additional service provided during the year the report showed that 7,542,077 additional car-miles were operated.

Among the improvements to the physical plant was an alteration in the covering of platform columns at Grand Central Station which illustrates how inches count in aiding a freer movement of passengers. The original tile coverings were removed and 2-in. concrete substituted with a net saving of about 4 in. in space around each of the pillars.

In addition to sums spent for current operations of the lines, the company expended about \$6,700,000 for new subway cars, additional shop and power facilities, contribution toward construction and equipment under agreement with the city.

A. W. Sperry to Survey Hartford-Springfield Road

Harrison B. Freeman, receiver for the Hartford & Springfield Street Railway, Warehouse Point, Conn., has engaged A. William Sperry, New Haven, to survey the company's property preparatory to an early move on the part of counsel for the bondholders to bring foreclosure action. This move is in line with a suggestion made some time ago by Judge Brown to Francis R. Cooley, chairman of the protective committee. The company has been in the hands of a receiver since October, 1918.

Recent changes in transportation methods have resulted in the development of a service in which twelve trolleys and fourteen buses are used. The company's franchises include ter-

ritory on both sides of the Connecticut River. Receiver Freeman reports that over the past six months receipts of the company have more than covered costs, due, he believes, to the development of the company's bus business.

Proposal to Change Municipal Accounting at San Francisco

Unsatisfactory methods in accounting, particularly with regard to depreciation reserve funds, have caused a movement before the Supervisors of San Francisco, Cal., to revise procedure with the municipal railway. The present ordinance provides an 18 per cent cut from gross revenue for the depreciation fund, to be used not only for depreciation but accident and damage claims and bond redemption, but expenditures have not been confined to these purposes. At present only about \$750,000 remains in the fund after withdrawals for additions and betterments and to cover operating deficits. Additions and improvements projected by supervisors would more than wipe out this \$750,000.

Experts maintain that the municipal railway requirements at this time call for a depreciation reserve of \$2,900,000. Had the 18 per cent fund been kept intact except for expenditures dictated by the ordinance, the fund would now be about \$2,850,000.

The new proposal is to set aside a fund equal to 4 per cent of depreciable assets of the municipal road and equipment, to be determined at the end of the fiscal year, for replacements and reconstruction; yearly surpluses, if any, would be invested for the fund. In addition it is proposed to set up 2 per cent of gross annually for accident and damage claims and to allocate other necessary sums for interest and amortization of bonds. The funds would be started off with \$300,000 transferred from the present depreciation fund to the new depreciation fund and \$100,000 for accident and damage claims. If the Supervisors adopt the plan, their difficulties in financing improvements to which they are committed will be increased, but the municipal railway accounting will be on a sounder basis.

Loss in Toledo in November

The Community Traction Company, Toledo, Ohio, showed a net loss to its stabilizing fund of \$19,952 as a result of operations in November, 1925. Revenue was \$286,126, compared with \$270,675 for a similar month in 1924, both being on same fare basis. In November 4,003,763 revenue passengers were carried for an average of 133,459 a day with five Sundays and a holiday cutting into the business quite heavily. The total deficit to the stabilizing fund is \$258,968 plus the original \$400,000 in the fund.

Street Railway Commissioner E. L. Graumlich announced that December and the first four months of the new year would probably show a surplus.

Board members approved the bill for \$21,427 submitted by Prof. H. E. Riggs, who conducted the recent transit survey. This amount exceeded the \$15,000 estimate made originally as the probable cost of the transit survey.

Taxes of Road in Receivership Remitted

The State Board of Control of Connecticut has voted to remit the taxes of the Danbury & Bethel Street Railway, Danbury, Conn., since the time it went into the hands of a receiver in 1917. The action is conditional, however, upon payment by the company of back taxes due prior to the receivership. These amounted to \$22,377. The taxes remitted amount to \$41,000.

A. W. Sperry, New Haven, consulting engineer of the company, states the company is in the hands of a receiver because, prior to the receivership, it failed to sell its service to the public. He believes that under proper management the line can be made to pay. One of the principal handicaps under which the company works is the fact that it operates between the two towns over a single-track line. The cost of laying another track now is prohibitive.

Approve Stock Program.—Stockholders of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., approved on Dec. 21 the program recently recommended providing for an increase in the authorized capitalization from \$40,000,000 to \$80,000,000. The plan contemplates increasing the common stock from \$20,000,000 to \$40,000,000 and reducing the par value from \$100 to \$20. It is expected additional preferred will be sold to investors over the counter.

Profit in November.—The Des Moines City Railway, Des Moines, Iowa, showed a profit of \$11,954 in November, bringing the deficit of the stabilizing fund to \$50,868. November was the second month the 10-cent fare was effective and the second month in which revenues have exceeded expenditures. The number of passengers carried in November was 2,102,982 and passenger revenue \$198,114, with operating expenses, depreciation and other charges amounting to \$155,869.

Surplus \$31,234.—The operating revenue of the Philadelphia Rapid Transit System, Philadelphia, Pa., for the month of November, 1925, was \$4,353,335, with operation and taxes of \$3,238,853. The surplus for the month was \$31,234. The total passenger revenue for the month was \$4,294,090. Of that amount \$4,157,035 was derived from surface, subway and elevated and \$137,055 from buses. The total number of passengers carried was 79,464,368, with 77,991,108, surface, subway and elevated passengers and 1,473,260 bus passengers.

Purchase of Philadelphia Taxis Approved by Council

Purchase of the Yellow Taxi Company by the Philadelphia Rapid Transit Company, Philadelphia, Pa., was authorized on Dec. 29 by the Council transportation committee's approval by a nine to one vote of an ordinance which enables the transit company to increase its capital stock by \$5,000,000 and thus finance the buying of taxicabs. The taxicab project in Philadelphia by the P.R.T. has been followed closely in these pages.

Personal Items

J. M. Bamberger Heads Terminal Company

Julian M. Bamberger, president of the Bamberger Electric Railway, Salt Lake City, Utah, has been elected president and director of the Salt Lake Terminal Company. Other officers named are William Story, Jr., vice-president and director; Henry I. Moore, one of the receivers of the Salt Lake & Utah Railroad (Orem line), secretary-treasurer and director, and Frank Orem, assistant secretary. Other directors elected were A. B. Irvine, U. L. Balser and D. P. Abercrombie.

N. S. Wilsie, general superintendent of the Bamberger Electric, has been elected general manager of the terminal company.

The reorganization was necessitated by the receivership of the Salt Lake & Utah Railroad. Mr. Bamberger succeeds Chapin A. Day, Ogden, as president. Mr. Day and Mr. Orem are the retiring members of the board of directors. The Salt Lake Terminal Company operates the terminal facilities in Salt Lake City for the Bamberger Electric and Salt Lake & Utah.

C. W. Stocks Heads Bus Association

Carl W. Stocks, editor of *Bus Transportation* and associate editor of *ELECTRIC RAILWAY JOURNAL*, was elected president of the New York State Motor Transportation Association, formerly known as the Auto Bus Association of New York State, at a meeting held on Dec. 22 in Syracuse. Mr. Stocks was at one time statistician of the American Electric Railway Association. When Albert S. Richey appraised the Knoxville property he became resident engineer in charge of the appraisal. His transportation experience was further augmented with long service in the operating department of the Bay State Street Railway, now the Eastern Massachusetts Street Railway.

C. M. Tew of Columbia Honored

Twenty-five years ago, or in December, 1900, Charles Matthews Tew, then a young man, entered the employ of the Columbia Electric Street Railway, Light & Power Company, Columbia, S. C., as a bookkeeper. A few days ago Mr. Tew was the guest of honor at a luncheon held at the Jefferson Hotel, Columbia, by officials and employees of the Broad River Power Company in celebration of the completion of a service with one concern extending over a quarter of a century.

True it is that the old Columbia Electric Street Railway, Light & Power Company, of which W. B. Smith Whaley was president, passed out of existence in 1911 when the name of the concern was changed to the Columbia Railway, Gas & Electric Company, but through the changes of name

and ownership Mr. Tew has held his place, his value as an employee being appreciated by incoming as well as outgoing administrations. At present he is paymaster of the company, now owned by the Barstow interests.

Mr. Tew was at first bookkeeper and later was made treasurer of the company. After E. W. Robertson secured control, Mr. Tew filled the position of auditor and so remained until September, 1924, when the Barstow interests bought the company.

E. J. Burns with Beeler Organization

Edward J. Burns, who resigned as assistant general manager of the San Diego Electric Railway, San Diego, Cal., during the summer of the present year, has become affiliated with the Beeler organization in New York City.



Edward J. Burns

The addition of this persistent and efficient railway worker to the staff of such well known engineers and consultants will undoubtedly work to the mutual advantage of both employer and employee. Mr. Burns' name is indelibly written with that of Mr. Claus Spreckels in the rehabilitation of the San Diego property, following the disturbing war-time days. The results of the combined efforts of these men have been realized to the fullest extent in that city.

Mr. Burns, known as Ed Burns, started his career at the age of 14 as call boy on a steam railroad. He went through the shops and other mechanical departments and then entered electric railway work with the Utah Light & Railroad Company in Salt Lake City. Later he went to the Key Route at Oakland, Cal. Following this work he was employed with the bureau of finance of the California Railroad Commission. Mr. Burns did not confine his activities to electric railway work for he next went with the San Diego & Southeastern Railway, a steam line, as manager, later absorbed by the San Diego &

Arizona Railway. It was while he was on this property that he first attracted the notice of the Spreckels interests, which resulted in the Spreckels-Burns combination, whose accomplishments have become well known on the Pacific Coast and elsewhere. In San Diego they not only tried train operation and the weekly pass, but they secured a modification of the franchise exempting the company from paving and other expenses. They built the new La Jolla line to the beach at a cost of \$2,000,000 and made San Diego the first street railway on the coast to make use of the motor bus. In addition they increased the good will of the company as well as the actual earnings. When Mr. Burns resigned at San Diego recently it was said there was a possibility of his going to the East, but the decision to settle in New York was not made until a few days ago.

J. B. Eastman became chairman of the Interstate Commerce Commission on Jan. 1 under the rule of rotation by which the position is filled from among the commission members. Mr. Eastman was formerly a member of the Massachusetts Public Service Commission. He was appointed to the federal body by former President Wilson.

John T. Harrington, president of the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, was elected president of the Trumbull Steel Company, Youngstown, on Dec. 16 at a reorganization meeting of directors. Philip Wiek of Youngstown has been president temporarily following the resignation of Jonathan Warner. Mr. Harrington's election as president of the Trumbull Steel Company in no way affects his connection with the Pennsylvania & Ohio Electric, of which he continues as president.

William Whiteford, assistant to the vice-president of the Twin City Rapid Transit Company, Minneapolis, Minn., has resigned, effective on Dec. 31, to become associated with the International Motor Truck Company at its new Northwest branch in St. Paul. Mr. Whiteford entered the employ of the transit company about twenty years ago as a clerk. Later he became general storekeeper and purchasing agent. Of late he has assisted Vice-President McGill in operation of the lines.

Alexander Shapiro, commercial manager of the Wisconsin Motor Bus Lines, affiliated with the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has gone to Washington, D. C., to make a survey of the lines of the Washington Rapid Transit Company, operating buses in Washington, D. C., recently taken over by the North American Company, which controls both the Milwaukee properties and the Washington Railway & Electric Company. Mr. Shapiro is well known in the electric railway field through his long association with the North American Company and the American Electric Railway Association, of which he was statistician. It is understood that for the time being at least he will be acting manager of the bus company in Washington. H. H. England, former

general manager of the Washington Rapid Transit Company, will act as assistant general manager.

Manfred K. Toepfen has resigned from the position of chief engineer of the Michigan Public Utilities Commission. He has opened offices in Detroit, where he will engage in consulting engineering.

Miss Lois Anderson has been appointed supervisor of service of the Interstate Public Service Company, Indianapolis, Ind., reporting to Harry Reid president. Her duties will include inspection trips on the railway and like visits to local offices. About a year and a half ago Miss Anderson accepted the position of assistant to the director of public relations in the company's office in Indianapolis.

Obituary

M. W. Flanigan

Mortimer William Flanigan, one of the best known electric railway men in western Pennsylvania, died on Dec. 12 from lobar pneumonia. Mr. Flanigan, superintendent of the north side division of the Pittsburgh Railways, was familiar to thousands of north side car riders. Born in Renovo, Pa., on Nov. 25, 1879, he went to Pittsburgh in 1899, relinquishing his office as general manager of the Westmoreland Railways in Derry, Pa., and becoming a division superintendent in Pittsburgh. He was a nephew of the late John Murphy, once general manager at Pittsburgh.

L. H. Griffith

Luther Henry Griffith of Seattle, Wash., one of the organizers of the West Street, Lake Union & Park Transit Company, which consolidated with the Seattle Street Railway and later became the Seattle Electric Railway & Power Company, died suddenly in Seattle on Dec. 14. Mr. Griffith was associated with many of the important industries in the upbuilding of Seattle, including the Green Lake Railway & Power Company, and the plan of connecting Lakes Union and Washington with Puget Sound by a maritime ship canal. He was head of a \$1,500,000 enterprise that built the electric line from Seattle to Tacoma in 1891 and promoted the Seattle Railway, opened in 1889. Other notable achievements of Mr. Griffith included the construction of the first electric line in Guatemala, construction of the first electric plant in Blaine, organization of the Seattle National Bank and the Boston & Alaska Transportation Company. Mr. Griffith was born in August, 1861. He completed his education at Cornell College in 1883. He settled in Seattle in 1886.

Allan B. Smythe, superintendent of police of the International Railway, Buffalo, N. Y., is dead. Mr. Smythe was instrumental in bringing about the arrest and conviction of members of the Amalgamated who dynamited the Niagara Falls high-speed line train during the last strike. For several years he was employed by the Philadelphia Rapid Transit Company.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

"1926 as I See It"

Various Manufacturers Whose Names Are Withheld Express Briefly Their Hopes and Fears for the New Year

Predictions for the future are particularly interesting when given by men of high standing in the industry which they represent. The following statements, gleaned from manufacturers who are closely in touch with the electric railway industry, should prove of value, even though the actual sources of the information are not made known. In each case the manufacturer was asked to state briefly his expectations for 1926, at least so far as his product was affected by the electric railway industry. The lines covered are thought to be sufficiently varied to give some definite impression of economic prospects for the present year.

Manufacturer of Steel Rails.—"The excellent condition which has been prevalent in the steel industry during 1925 will, in all probability, continue at least through the first half of the present year. Unfilled orders continue at a high total, considerable maintenance and extension work on steam and electric roads is in prospect, and the industry as a whole is expected to respond to the general economic stimulus which reached a peak during the past year."

Manufacturer of Trolley Wire.—"We are not looking for an exceptional year in 1926. With the exception of certain proposed electrification projects in steam railroads, little extension work is in prospect at present. Copper will probably not exceed 15 cents per pound—the figure upon which we have calculated our selling budget—for the major portion of the year."

Car Manufacturer.—"Present indications are that car orders through 1926 will not decrease over the past year, at least so far as the electric railways are concerned. Any falling off in orders which may occur, however, will probably not manifest itself until late spring or early summer, as the industry is assured of a certain amount of activity following the publication of annual budget reports."

Bus Manufacturer.—"A year of continued expansion, increased production and new developments in bus design is our forecast for 1926. Many additions to existing operating fleets are contemplated and, in addition, numerous other railways are considering the advisability of supplementing their trolley service with co-ordinated bus operation."

Ticket Manufacturer.—"The year 1926 should prove a fairly good one for our industry. With economic prosperity the number of people riding on various transportation agencies increases. Naturally this stimulates the

use of transfers and tickets. It is interesting to note, however, that the demand for theater tickets is inversely proportional to employment, so that this phase of our business is just now subject to a certain slackening off."

Manufacturer of Car Fittings.—

"The electric railways are apparently not due to suffer very severely from 'growing pains' during 1926. Few orders have been received from these sources in recent months, and this year will probably not herald many large additions to rolling stock. Steam railroads are showing more activity in this direction. Recent developments have shown that the lull in orders experienced a few months ago was merely a temporary condition."

Record-Breaking Order

Yellow Coach Company Designated to Supply 333 Gas-Electric Buses for Public Service Company

More than \$3,000,000 will be spent all in one lump by the Public Service Transportation Company of Newark, N. J. This has been set aside for the purchase of 333 gas-electric 29-passenger motor buses. The new equipment will be obtained from the Yellow Truck & Coach Manufacturing Company of Chicago. It was stated by J. A. Ritchie, president of the Yellow Coach company, that this is the largest single order ever written for automotive units.

Decision to make this material addition to the bus equipment of the transportation company was announced on Dec. 24, but the manufacturer to whom the contract would be given had not been determined at that time. Several days later the transportation officials announced their choice of the Yellow Coach company and stated that delivery of the new equipment would begin in February and would continue at the rate of approximately 100 a month until the order was completed.

Electrical equipment for the new buses will be supplied by the General Electric Company and will be sent directly to the Chicago plant of Yellow Coach, to be there incorporated into the units. The possibility was suggested that some of the bodies might be built in the Plank Road shops of the Public Service company in order to facilitate the placing of the buses in service.

The new equipment, together with Yellow buses now operated by the Transportation company, will constitute a fleet of 411 units of this manufacture. During the past 2½ years the company has expanded its service through the purchase of independent operations and the installation of new routes until its fleet today numbers 800 buses. Many of the miscellaneous and obsolete units have been scrapped, to be replaced with modern equipment,

and it is expected that the entire fleet will be standardized before long. The New Jersey company is the largest operator of motor buses in the country at the present time.

American Creosote Works Gets Norfolk Plant

American Creosote Works, New Orleans, La., has announced the completion of its plans to purchase the Atlantic Creosoting & Wood Preserving Works at Norfolk, Va. A large

water-front property fronting on deep water and adjacent to the Portsmouth Navy Yards has been acquired and it is now proposed to erect a large and modern creosoting plant to take care of expanding Eastern business.

W. H. Wales, formerly president of the Atlantic Creosoting & Wood Preserving Works, will be in charge and the entire personnel of the two companies will be retained. The new plant will be operated under the management of the Savannah Creosoting Company, a connection of the American Creosote Works.

ment takes on added importance. The explanation lies in an assiduous cultivation of the domestic market by the producing companies and in increased efficiency of output and handling.

The manufacture of trolley wire has not touched abnormal heights, however. A keen degree of competition, a policy of watchful waiting and of slow buying among electric railways, and a not too rapid rate of electrification activity on the part of steam roads, have rather held production within well defined bounds.

Cars—A complete review of car manufacturing operations is given elsewhere in this issue. It is not necessary to recapitulate the information here. Suffice to say that but 1,612 cars were purchased by the industry throughout the year, most of the operating companies preferring to "sit tight" and keep outlays for new rolling stock to a minimum.

Steel and Iron—It is here perhaps that the general conditions of prosperity, current in the country throughout 1925, are better exemplified than in any other industry closely affiliated with the electric railway field. After a year of well-sustained and well-balanced activity, the iron and steel producers are in an agreeably strong position. Production of pig iron in the first eleven months of the year reached a total of 33,145,498 tons, as compared with 28,146,600 tons in the corresponding period of the preceding year. Steel ingot output in the same period is estimated at 40,211,069 tons, which compares with 33,241,906 tons in 1924. These totals show gains of 18 per cent in the output of pig iron and 21 per cent in steel ingot production. While prices have remained at a moderate level, reports of the leading companies clearly indicate that the industry as a whole will be able to report a fairly prosperous year.

As reported in the *ELECTRIC RAILWAY JOURNAL* for Dec. 19, the production of steel rails is one of the most important factors in the iron and steel industry, and it is the total of unreported orders for this material which makes it

Snapshots of Industry in 1925

In Which Are Portrayed the Outstanding Features of the Manufacturing Year, With Particular Reference to Certain Industries Producing Materials and Supplies for Electric Railway Consumption

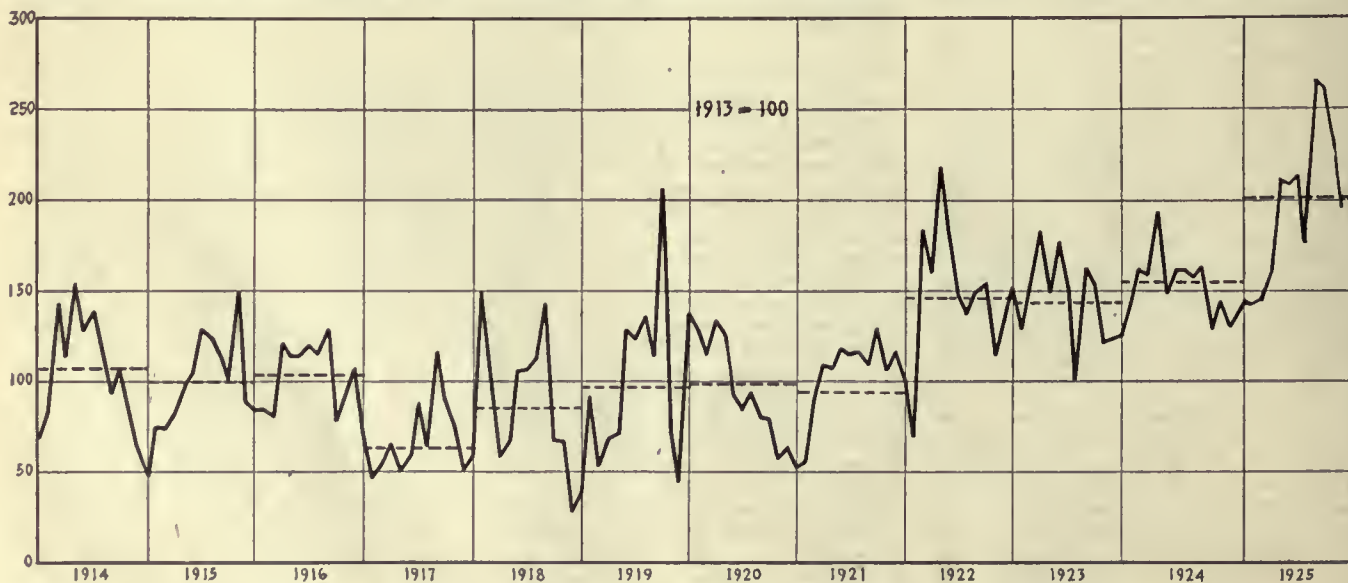
GENERALLY stabilized prices throughout a year of moderate purchasing with most of the operating companies holding to the even tenor of their ways but with an occasional large order causing manufacturers to sit up and take notice—that, in brief, was 1925, so far as makers of electric railway equipment were concerned. The trend of prices was, for the most part, gradually downward, although certain materials advanced slightly in response to localized conditions. Little of the general economic stimulus prevalent in industry as a whole made itself felt among producers of equipment and materials whose consumption was limited solely to electric railways.

Leaving this specialized field for a moment, however, and considering the economic condition of the country as a whole, it becomes apparent that the year which has just come to a close was a truly noteworthy one from the standpoint of general industrial prosperity. Business was far more active than at the close of 1924 and although the gains in most lines have not been striking, they have been fairly regular. Agriculturally, the country falls considerably short of being as prosperous as it

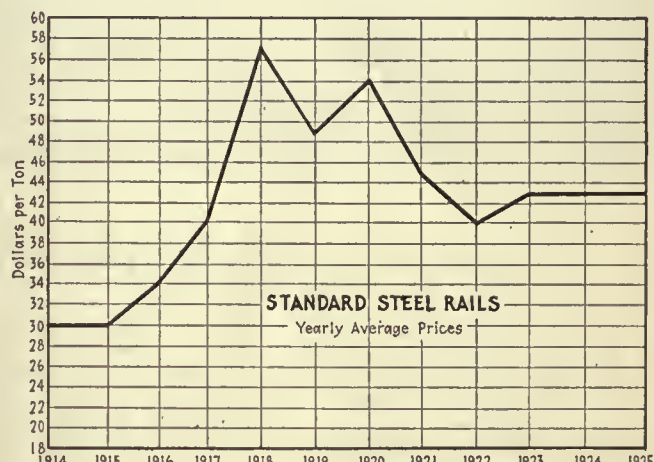
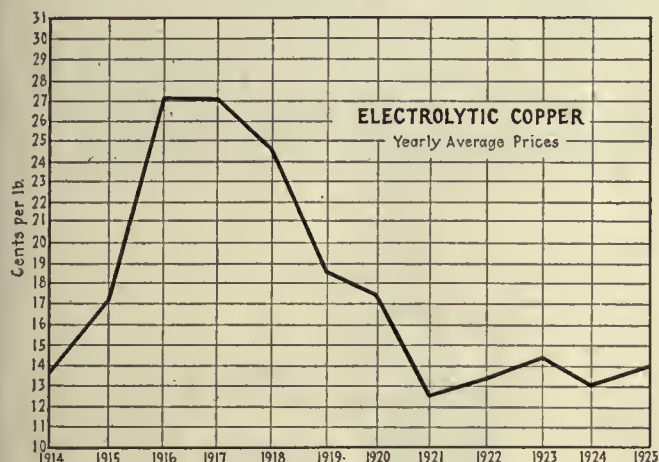
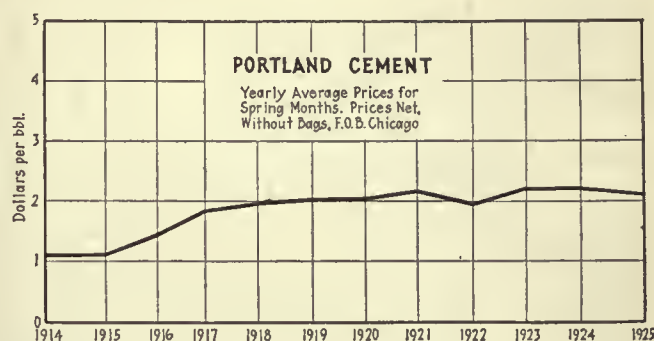
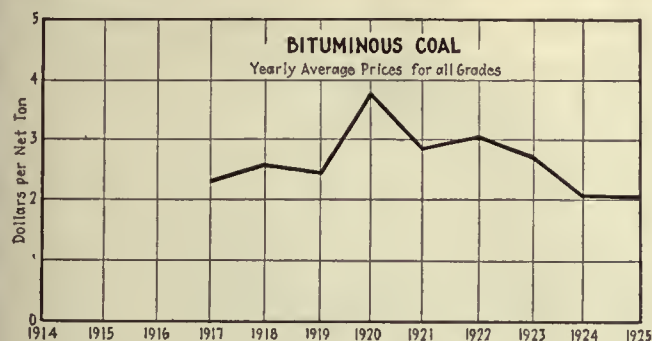
might be, but other than in the farming districts, production, distribution, employment of labor, clearing of bank checks, and other recognized trade indexes, show an accelerated progress that has brought about an upswing of buying in almost every important industry of the nation.

Despite financial and political uncertainty existing in various other countries, the foreign trade of the United States for the first three-quarters of 1925 exceeded in value that of any full year prior to the war year of 1916. The total trade for 1925 will surpass the trade of any year excepting only 1917, 1918, 1919 and 1920. Considerable electric railway and bus equipment was exported, particularly to the Orient and to South America, although the competition with European manufacturers is becoming an increasingly serious problem.

Copper—Even with fluctuating foreign markets, causing a material slump in copper exports, this industry reported a better record in 1925 than was obtained during the year previous. Inasmuch as production in 1924 broke all former records save those made under abnormal war conditions, this achieve-



General Construction Volume Index Curve Showing Response Made by All Types of Building Activity to Economic Prosperity



Representative Prices Indicated Over a Period of Years. Note Practical Absence of Fluctuation in 1925

impossible to determine the exact degree to which production during 1925 exceeded all records previously established. The Department of Labor states that practically all mills in steel centers have been operated on satisfactory schedules for the past month.

Electrical Equipment.—Demands for new equipment during 1925 have led prominent manufacturers in this field to believe that conditions are slowly improving in the electric and steam railway fields. Considerable sums have been expended in this direction for maintenance work and for bringing out-of-date and unsatisfactory equipment to a point somewhere approaching modern efficiency.

Particularly noteworthy has been the enthusiasm manifested in oil-electric motive power. Several steam roads have purchased oil electric engines and the New York Central is planning to try out an oil-electric articulated car on some of its branch lines. New developments have also been made in power plant equipment, automatic railway substations, and in general operating equipment.

Buses.—A considerable momentum of production has been built up in the automotive field since the depression of last summer, and it is expected that this will tend to keep business active in this industry during at least the first part of 1926. Conditions are in a healthy state of balance at present; employment is large, prices relatively stable, and transportation facilities are ample and efficiently operated. Credit conditions in this field are said to be exceptionally sound and with the careful control of production which is now the rule, the expectation of active spring and early summer business

seems to be justified, barring, of course, unforeseen industrial disturbances of an inclusive nature.

A number of important mergers occurred in the bus manufacturing field during 1925, notably that involving the Yellow Coach Manufacturing Company with the General Motors Corporation and that of Graham Brothers with Dodge Brothers. Much attention has been given to the encouragement of co-ordinated bus and trolley service as a part of operating companies. The increased interest shown in gas-electric bus development has led many companies to add large numbers of these units to their fleets.

Tires.—Plans are at present taking shape to break the British monopoly on rubber. The 50 per cent increase in tire prices made during the past year is due almost entirely to the exorbitant rate charged for crude rubber. In fact the price of the crude materials increased nearly 400 per cent over a period of about twelve months, and the retail prices of tires were only held down, partly by increased production efficiency and partly because early in the year tire makers worked on the basis of comparatively cheap rubber, contracted for during the fall of 1924. The rather startling total of \$700,000,000 is being taken in annually over and above what the British themselves agree would be a fair price. As long as the monopoly continues little relief can be expected, according to various authorities in the field.

Coal.—Considerable stimulus has been given the bituminous coal industry of late due to the "bitter end" aspect of the anthracite strike. In consequence, fairly heavy buying has resulted and the prices of most of the grades have

advanced slightly in the past few weeks. Several soft coal mines, previously closed, have been reopened to help meet the increased demands, and a consequent increase in employment has manifested itself in the bituminous region. The average yearly price for all grades during 1925, however, was slightly less than that of the previous year.

General Construction.—As illustrated in the accompanying construction volume index curve, the mean of construction for 1925 shows an important rise over that of the years immediately preceding it. This curve may be accepted as a reliable index of construction trend, since it is based on comprehensive reports embracing every type of industrial and commercial construction work.

Safeguard for Magnetic Flagman

Characterized as the most recent contribution to the field of adequate crossing protection, the "Out of Order" signal is prominently featured in a recent catalog issued by the Magnetic Signal Company, Los Angeles, Cal. The manufacturers of the "Magnetic Flagman," which has been adopted as standard on a large number of steam and electric roads throughout the country, have been devoting considerable attention recently to the problem of obviating any dangers which might result from operating failures. That the automatic out-of-order signal meets this need has been satisfactorily demonstrated by the engineers of the company.

The catalog itself is very attractively arranged. Many interesting pictures and diagrams are included to clarify

the printed descriptions. Detailed specifications of the various types of magnetic flagmen are presented and their most important applications discussed.

Dodge Brothers Increasing Factor in Bus Field with Merger

Dodge Brothers' position and lead in the commercial car field was further strengthened by the recent acquisition of a majority interest in Graham Brothers, largest exclusive producers of motor trucks in the country. More than 20 per cent of the combined production now consists of commercial cars, trucks, buses and chassis. Plant additions totaling about \$8,000,000 as financed out of surplus are expected to be completed early in 1926, production capacity being increased nearly 50 per cent thereby.

This large increase in production will make possible the reduced scale of prices recently announced by Dodge Brothers. With a month's production still to be reported, sales for last year are already 17,000 cars in excess of sales for the entire year of 1924 and are the largest heretofore in the history of the business, according to official figures issued by the company.

Electrification Recommended as Aid to Farmers

How can the great triumvirate of manufacturers, transportation agencies and farmers work together to further their individual and mutual interests? This important question was discussed in detail at the annual banquet of the Illinois Manufacturers' Association held at the Hotel LaSalle, Chicago, on Dec. 9. Gerard Swope, president of the General Electric Company, spoke for the manufacturers; W. R. Cole, president of the Nashville, Chattanooga & St. Louis Railroad, represented the transportation field; while the agricultural interests were upheld by Eugene D. Funk, Bloomington, president of the American Seed Trade Association.

Mr. Swope advocated a greater development of electric power for the benefit of the three industries. He said that better power development in the United States must be had if the country is to maintain its position of leadership. Adding that the marketing of their products was the greatest problem before farmers, he declared that power development would prove of particular aid to the rural districts. Electrification would give the farmer a larger proportion of the amount for which the goods are sold to the consumer by increasing output and decreasing production expenses.

Mr. Cole, speaking for transportation, declared that, while the railroads were sympathetic with the efforts of the farmers to meet their various pressing needs, the present transportation costs are justly apportioned and are not to be blamed for the depressed condition of agriculture.

Mr. Funk, representing the farmers, voiced the opinion that the future of Middle West farmers is black unless something besides temporary solutions are found for the various agricultural difficulties.

American Car & Foundry Enters Automotive Field

The American Car & Foundry Company has announced the formation of the American Car & Foundry Motors Company, this marking the first important entry by a railroad equipment company into the automotive field. The new company, which was incorporated in Delaware, will own a controlling interest in the Fageol Motors Company of Ohio, manufacturer of buses and trucks, and in the Hall-Scott Motor Company of Oakland, Cal., manufacturer of gasoline engines for motor trucks, airplanes and motor boats. The new company in turn will be controlled by the American Car & Foundry Company.

Colonel Ayres Says What's What

Here is a prediction for 1926 which isn't anonymous. It is by Leonard P. Ayres, vice-president of the Cleveland Trust Company and an economist nationally known. His views appeared in the *Cleveland Plain Dealer*, following a speech made before the Chamber of Commerce on Dec. 15. He annually addresses the chamber on his forecasts for the coming year. It was found, upon checking his statements made a year ago concerning 1925, that they had generally proved correct.

A year of prosperity reaching its highest speed in late summer and then slowing up. Building construction rising to a new high record in the spring and then starting downward.

Building costs remaining high—proportionately higher for labor than for materials.

Iron and steel produced in even greater volume than in 1925, mainly on account of the demands of railroads.

An automobile production of about 4,000,000.

The bull market on the stock exchange continuing until early next year, when the New York Federal Reserve Bank raises its rate and precipitates a "wave of fear."

Rising wages, rising costs of living, narrowing profit margins, higher wholesale and retail prices and a volume of industrial employment coming to a peak and turning down.

Rolling Stock

Scranton Railway, Scranton, Pa., it is reported, plans to purchase additional one-man cars.

Durham Public Service Company, Durham, N. C., has placed an order with the Reo Motor Car Company for eight buses of 21 passenger capacity.

Metal, Coal and Material Prices

Metals—New York	Dec. 30, 1921
Copper, electrolytic, cents per lb.	14.125
Copper wire base, cents per lb.	16.00
Lead, cents per lb.	9.25
Zinc, cents per lb.	8.96
Tin, Straits, cents per lb.	63.375
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	\$5.00
Somerset mine run, Boston, net tons	2.075
Pittsburgh mine run, Pittsburgh, net tons	2.05
Franklin, Ill., screenings, Chicago, net tons	1.875
Central, Ill., screenings, Chicago, net tons	1.425
Kansas screenings, Kansas City, net tons	2.30
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	\$7.00
Weatherproof wire base, N. Y., cents per lb.	18.25
Cement, Chicago net prices, without bags	2.10
Lined oil (5-bbl. lots), N. Y., per gal.	0.95
White lead in oil (100-lb. keg), N. Y., cents per lb.	0.1550
Turpentine (bbl. lots), N. Y., per gal.	\$0.99

Miami Beach Railway, Miami, Fla., recently received twelve new cars. The specifications follow:

Date order was placed	July 24, 1925
Date of delivery	October
Builder of car body	Perley A. Thomas Car Works
Type of car	Light-weight, double-truck, one-man safety
Seating capacity	48
Total weight	36,000 lb.
Bolster centers, length	20 ft. 0 in.
Length over all	45 ft. 9 in.
Width over all	8 ft. 4 1/2 in.
Height, rail to trolley base	10 ft. 11 in.
Body	All steel
Interior trim	Cherry
Headlining	1/4-in. Agasote
Roof	Arch
Alr brakes	General Electric
Bumpers	Channel
Car signal system	Electric Service Supplies Company
Compressors	General Electric
Control	K-35
Curtain fixtures	Curtain Supply Company
Destination signs	Hunter
Door-operating mechanism	National Pneumatic
Fenders	Consolidated
Finish	Varnish
Gears and pinions	General Electric
Hand brakes	National Brake Company
Headlights	General Electric
Lighting arresters	General Electric
Motors	Four GE-265, 35 hp.
Registers	International
Sanders	Ohio Brass
Sash fixtures	O. M. Edwards
Seats	Hale & Kilburn
Seating material	Wood slat
Slack adjuster	American Brake Company
Step treads	American Abrasive Company
Trolley retrievers	Chas. I. Earl
Trolley base	Ohio Brass, Form 4
Trucks	Brill, 76-E-1
Ventilators	Railway Utility Company
Wheels	Pollak Steel Company 26-in.

Trade Notes

T. D. Owler has been appointed railway sales representative at Chicago, for the Heywood-Wakefield Company, New York. He will take up his new duties after Jan. 1, following the retirement of Edward Buker, his former chief, who is going into business for himself.

Erie Electrical Equipment Company has announced the appointment of the Universal Electric Sales Corporation with offices at 30 Church Street, New York; 11 Beacon Street, Boston, and 332 Healy Building, Atlanta, Ga., to represent it in the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, Eastern Pennsylvania, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida, Tennessee and Alabama.

Fageol Company, Kent, Ohio, shipped five new buses to the Jacksonville Traction Company, Jacksonville, Fla., during the first half of December. The railway is under the executive management of Stone & Webster, New York. It will use the new units in its program of bus and trolley service co-ordination.

W. J. Nugent, vice-president and general manager of the Nugent Steel Castings Company, Chicago, has been elected president to succeed Charles Piez. Prentiss Coonley has been elected vice president and C. A. MacDonald, secretary, has been elected to fill a vacancy on the board of directors. Mr. Nugent has been associated with the company since 1918. The interests of Mr. Piez have been taken over by Mr. Nugent and others. The company was organized in 1916.



Pittsburgh Rys. Co.

PEACOCK STAFFLESS BRAKES



—for modern city cars

Light-weight, space saving dimensions, increased braking power and unlimited chain-winding capacity — these are the Peacock Staffless Brake advantages which have appealed to buyers in 1925. These same features should be your guide in specifying hand brake equipment for modern cars in 1926.

National Brake Co., Inc.

890 Ellicott Sq., Buffalo, N. Y.

Canadian Representative:

Lyman Tube & Supply Company, Limited, Montreal, Canada

—for modern interurban cars

Illinois Traction Co.





Hand in Hand advertising and lower sales cost

It is to the buyer's interest to know that goods are sold *economically* for he pays the cost of selling just as he pays for the cost of manufacturing.

That's why more and more buyers are scrutinizing sales methods of manufacturers, for they know that excessive sales costs mean either higher prices or shrinking quality.

The seller who clings to antiquated, expensive methods of selling is no more entitled to patronage than one who runs an out-of-date factory.

Machinery has cut costs and standardized products in manufacturing and the *machinery of advertising* is accomplishing similar benefits in selling, for advertising in publications such as this one, is not an added expense, but an improved means of communication that takes the place of slower and more costly methods.

These are demonstrated facts and thinking buyers are recognizing the advantage to them of encouraging progressive, economical sales methods, such as have been adopted by the companies represented in the advertising pages of this journal.

The advertising these companies are doing not only cuts the cost of selling, but it increases production volume, standardizes quality, and is a guarantee of good faith.

Write us about anything you desire to know about business papers or the fields they cover.

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ASSOCIATED BUSINESS PAPERS, INC.
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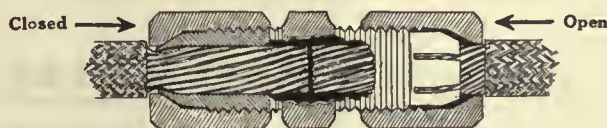
"Member of The Associated Business Papers, Inc." means proven circulations PLUS the highest standards in all other departments.

This publication is a member of the A. B. P.

Frankel Solderless Connectors

for

**Solid, Stranded and Flexible Cables
Standard and Iron Pipe Size Tubings**



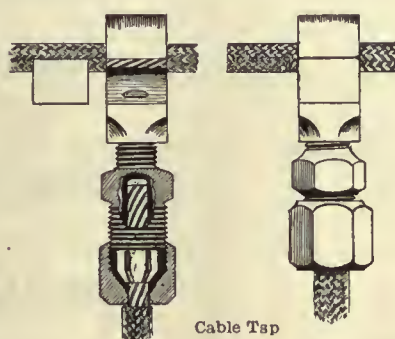
Sectional view of a Frankel Two-Way Connector showing one of the compression nuts in an open position and the other one closed, demonstrating how closely the conductor is gripped.

ELECTRICALLY Frankel Solderless Connectors will carry a full load with but 2° to 5° Centigrade temperature rise, as compared to the cable connected.

MECHANICALLY they will show no fatigue, holding both tensile strength and current carrying capacity for ∞. The standard connector will "pull" at approximately one-fourth the ultimate tensile strength of the cable.

TIME OF APPLICATION considered they require a minimum number of operations and a minimum amount of time to complete a joint.

FRANKEL SOLDERLESS CONNECTORS will show a saving in labor and material, and are superior to the best type of soldered or mechanical connectors.



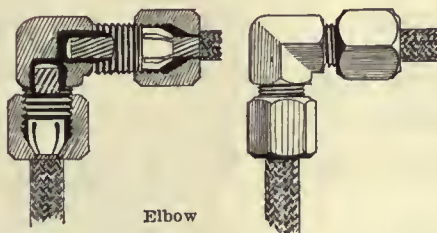
Cable Tsp



Front Lug



Three Way



Elbow

APPROVED by the National Board of Fire Underwriters for all classes of wiring, Frankel Solderless Connectors eliminate the necessity for solder in making electrical connections and splices.

MADE FOR EVERY KIND OF CONNECTION—such as angle and swivel lugs, two-way and three-way connectors, stud connectors, equalizers, reducers, elbows, Y's, service box lugs and plugs, terminal and switchboard lugs (front or back connected), grounding devices, etc.

OUR ENGINEERING DEPARTMENT will gladly assist you in the selection or design of the types best suited to meet your requirements.

Send for Our Catalog 6-W

Manufactured by

FRANKEL CONNECTOR CO., Inc., 177 Hudson St., New York, N. Y.

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Cleveland, Ohio.



Adapted to all
Types of rails
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GODWIN Steel Paving Guards

Proven by service to economically prevent
seepage and disintegration of street railway
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Write for Illustrated Catalog No. 20

W. S. GODWIN CO., Inc.
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The Arabian junk dealer has for his motto
"Stick to your job."

It is his custom to cut his feet and even to tie
his body against any possible temptation to leave
his post.

"Tied to the job" is the way we express it.

Of course we see many operators in this country
that are tied to the job—usually by poor brushes—
so that they too cannot leave their machines for a
minute.

Let us point out here that both ties are self-
inflicted and can be shaken off—one by Morganite
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Morganite Brush Co., Inc.

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VALUE IS A MEASURE OF COMPARATIVE DESIRABILITY



*A
new name
that's fifty-
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GraybaR

Western

SUPPLY

Changes name—

Effective January 1st, that part of the Western Electric Company known as the Supply Department takes Graybar Electric Company as its name. This involves no change whatever in the existing distributing organization. Nor does it affect the facilities offered to buyers of electrical supplies all over the country. The significance of the change is found rather in the source of the new name, 56 years earlier in the history of the company.

In 1869 Gray and Barton began the making of electrical supplies. In the early seventies Western Electric was adopted as the company name. After Bell invented the telephone in 1876, telephones were added



Electric

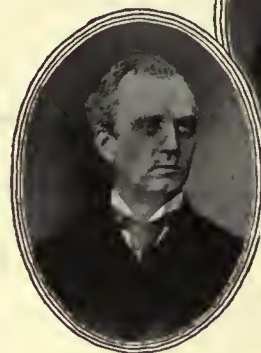
DEPARTMENT

to the line, and in 1882 the company became the manufacturing department of the Bell Telephone System.

During all these years the company has carried on at the same time a merchandising business under the title of the Supply Department, selling to the American public all types of electrical products. The growing complexity of these dual responsibilities—on the one hand, to the Bell Telephone System; on the other, to the general user of electrical supplies—now makes it advisable to separate the two functions. Hence the Supply Department, serving as before in every electrical field, becomes a distinct corporate organization.

It takes the name Graybar, derived from Gray and Barton. A new name; but carrying with it a reputation 56 years old.

Founders in 1869
of Gray and Barton,
now Graybar
Electric Company



Enos M. Barton



Elisha Gray

GraybaR

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C O M P A N Y . . . I N C O R P O R A T E D

SUCCESSOR TO SUPPLY DEPT.

Western Electric



*Looking
forward
to the next
fifty-six
years of
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Above . . .

One of several International 6-Cylinder Coaches owned by the Inter Cities Coach Company of Dayton, Ohio, and operated on the Dayton-Troy-Piqua-Sidney Division. These highly successful coaches succeeded others of well-known manufacture. The various bodies supplied for the 6-cylinder chassis carry 24 to 33 passengers. Regular equipment includes air brakes on all four wheels and every appointment detail known to highest grade coach manufacture.

International Harvester coaches are surpassed by none, considered from every standpoint—mechanical design, beauty, comfort, safety, etc. Detail comparison and performance records will make this clear to you.

International Harvester 6- and 4-Cylinder Motor Coaches

THE Harvester Company pioneered in coach building. Its oldest coaches are veterans working beautifully today. Its de luxe conveyances and its handy little speed sedans are keeping coach lines highly profitable and delighting passengers from Walla Walla down to Winter Haven.

Do you appreciate good service? Well, we take pride in ours—service delivered to our automotive customers through 112 branch houses, largest company-owned truck and coach service organization in the world.

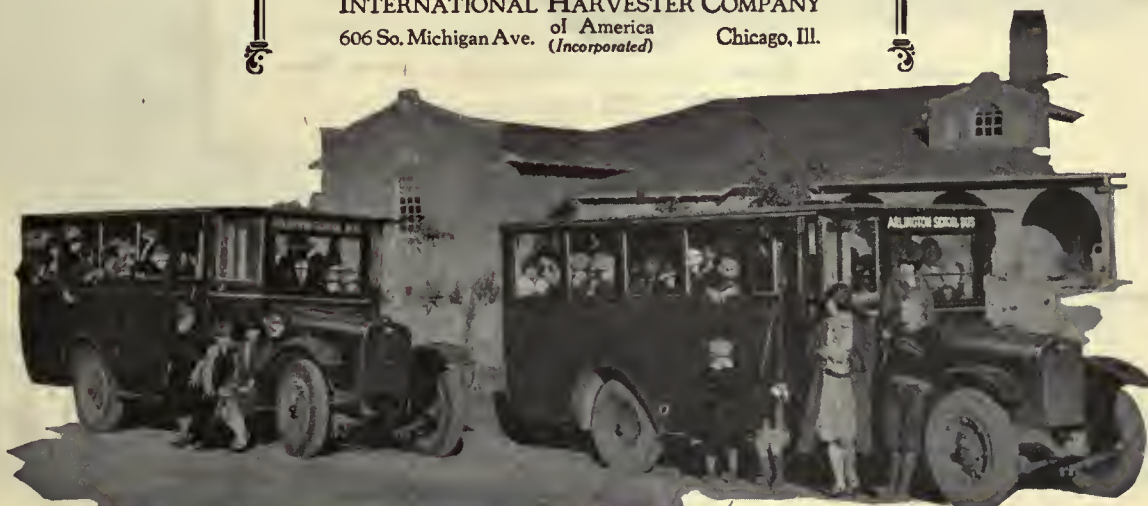
Complete information on request.

INTERNATIONAL HARVESTER COMPANY
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Below . . .

Two of the International SL 4-Cylinder Coaches on the underslung chassis, in operation at Arlington, Florida. Each vehicle seats 50 school children comfortably.

The obvious features of the International SL 4-Cylinder Coach—sturdiness, flexibility, low and roomy design, and economical first cost and upkeep—recommend it for schools, golf clubs, suburban routes, station service, as auxiliaries to bigger coaches, etc. In Chicago they serve large department stores. In Memphis a bus line operator has developed one of the largest motor travel enterprises in the South, on International exclusively. He now has 58 of the 4-cylinder and a number of 6-cylinder International coaches.

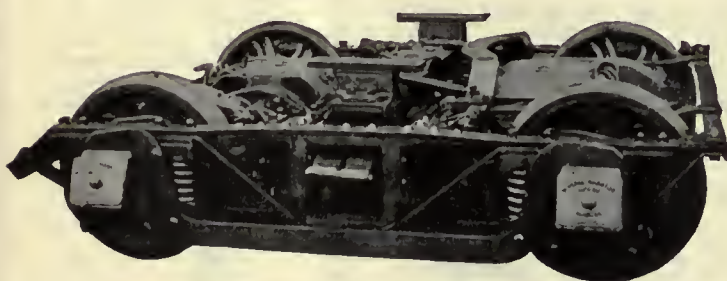




Modern Light Weight Cars, and Gas-Electric Drive Motor Coaches to meet

Supplying the requirements of electric railways for over twenty-five years, this organization has developed principles of design and methods of construction which have always been abreast of the requirements of the time. We build light-weight, attractive and comfortable cars such as are in demand today.

We also furnish snow fighting equipment, work cars and light-weight trucks.



Type MC 62 Truck
For low car bodies, city service—inside brake equalizer design, 26 inch wheels.

Our engineering department is at your service when considering the matter of new equipment. We will gladly submit drawings and specifications and quote therefrom, or bid on your specifications.

**Snow
Sweepers
Snow Plows**



Cummings Car

Successor to McGuire-Cummings Manufacturing Co.



All the experience gained in building high class cars for electric railways is embodied in this new Gas-Electric Coach. Twenty-five, twenty-nine passenger and double-deck bodies can be furnished.

every need of city and interurban transportation

MOTOR COACH BODIES

to suit all requirements



Decided superiority in every detail marks this new Gas-Electric Coach. Upon a chassis of exceptional strength and perfect rigidity is mounted a body at once attractive, comfortable, and of long life. Wide deep seats, full leather upholstery, a wide aisle, plenty of headroom, wide windows, metal sash and abundant lighting equipment are individual features contributing to the excellence of the whole. The absence of clutches and gears eliminates noise, jerks and shocks when starting, gives faster, smoother acceleration, avoids driver fatigue, thus making for better schedules and improved safety, and decidedly improved riding comfort. In addition, the wear and tear of driving mechanism is diminished, reducing maintenance costs and operating costs, and lengthening the life of the Coach.

We also furnish street railway type motor coach bodies for chassis of other manufacture.

And Coach Co.

General Offices: 111 West Monroe Street, Chicago, Ill.

MOTOR BUS DEVELOPMENTS



*Specify
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Air Brakes"
on the buses
you buy*

During the past year the greatest progress has been made in the application of air brakes to motor buses.

Two noteworthy developments by Christensen have been brought to their

They are—

The Front End Compressor Mounting

The Front End Compressor Mounting was originated by Christensen two years ago, but the 1925 refinements in design and conditions in the bus industry have brought about its recognition in a most convincing way by motor manufacturers.

Six of the most important motor builders have made changes in the design of their products to accommodate the Christensen front-end mounting; a strong endorsement by those who KNOW.

The Front End Mounted Christensen Compressor is driven direct from an eccentric on the main crank shaft. No gear, belt, chain, or universal drive troubles are possible, for the direct drive eliminates their use entirely. It is the simplest, most durable drive available.

Christensen

CHRISTENSEN
6513 Cedar Ave.,



AIR BRAKE IN 1925

present high state of usefulness during this period, and have been important factors in making possible the speed, safety, economy, and fatigueless operation necessary to present-day bus transportation.

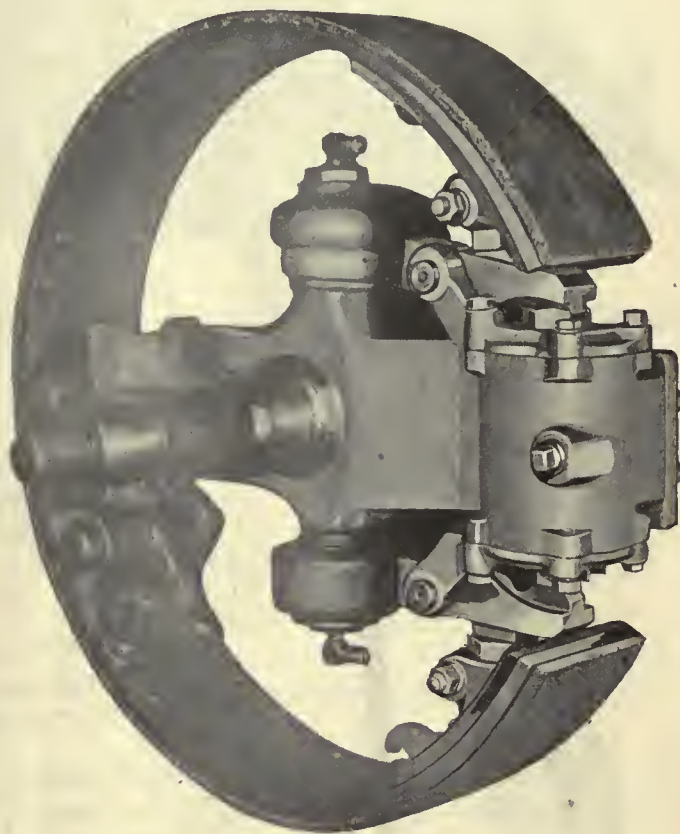
and

The Enclosed Multiple-Power Brake

The Enclosed Multiple-power Brake was developed to deliver the power necessary for quick stops by very heavy vehicles—double-deck buses particularly. It follows out the Christensen principle of simplest possible mechanism, fully enclosed by the brake drum, with no outside levers, pull rods, cables, knuckles, universal connections or cams.

In the Multiple-Power Brake sturdy levers between the piston stems and the opposing ends of the brake shoe multiply the power of the piston thrust. Thus, with no increase in operating air pressure, the braking thrust may be doubled, tripled, or even further multiplied.

The only connection between wheels and frame is the flexible reinforced hose that carries the air to the cylinder.



So important to the bus operating company are these two distinctly Christensen features that, if you are operating buses or contemplating their operation, you cannot afford to be without full knowledge of them. The complete Christensen system is described in the booklet "Christensen Automotive Air Brakes." *Send for a copy.*

Air Brakes

AIR BRAKE CO.,
Cleveland, Ohio.





Shasta Transit Company
 UNION STAGE DEPOT
 SACRAMENTO
 TELEPHONE MAIN 674

The Fisk Tire Company, Inc.
 1401 Kay Street
 Sacramento, California.

November 7th, 1925.

Gentlemen:

Attention of Mr. W.B. Jenkins.

We are writing this letter to express our satisfaction of the service we have received from Fisk Transportation Cords during the past summer and fall.

We operate between Sacramento and Redding and each of our stages run approximately 350 miles a day. We consider this a severe test on tires, especially in summer, as the thermometer registers as high as 114 degrees in the shade and the stages are running about 13 hours at a stretch. We maintain a strict schedule and uninterrupted service is a vital factor in the service we render to the public.

In view of the splendid service we have received from your product we are sending you this letter of appreciation together with a picture of one of our new cars equipt with Fisk Fillerless Cords.

Yours very truly

Shasta Transit Company
 Geo. H. Woods.

CHW/w
 Enc.
 WE OPERATE STAGES BETWEEN SACRAMENTO AND REDDING AND MT. Lassen NATIONAL PARK



Time to Re-tire
 Get a FISK
 TRADE MARK REG.
 U. S. PAT. OFF.

FISK TRANSPORTATION "Fillerless" CORDS



Winning Leading Patronage



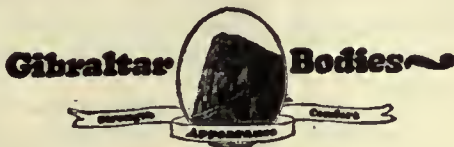
Thirty-three Passenger—Latest Approved Design—Worked Out from Actual Study of the Riding Public by Large Independent Successful Operator.

One hundred thirteen of these bodies will soon be in service for the Detroit Motorbus Company. Those now in service are fulfilling the highest expectations of their engineers. The Detroit Motorbus Company was pleased with the careful engineering of the initial bodies. They are gratified with the rapidity with which these bodies are produced in quantities.

Large production resources—long experienced personnel—carefully selected materials—good common sense body construction—insure

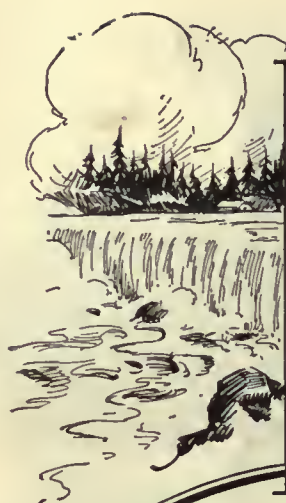
quantity production of standardized types of bus bodies fit for heavy duty service with low maintenance cost.

These factors are winning the patronage of leading chassis manufacturers and large fleet operators.



THE AUTO BODY COMPANY
LANSING, MICHIGAN





This Question of "Service"



SO MUCH has been said and written about "service" during the last few years that the average business man is getting suspicious of the word. He knows that business isn't knight errantry, and that no commercial concern is operating with purely altruistic motives. So, as soon as he hears the word "service," he begins to grow skeptical. However, there is a kind of "service" which, though intended primarily to protect the seller, is also a benefit to the buyer.

For instance, we know that

Standard Oils and Greases

are made right, from the highest quality crude oil especially chosen for its lubricating oil content, and that they will, if used correctly, give the most satisfactory results.

But—unless they are used correctly, the buyer cannot expect full satisfaction. No one grade of oil or grease will lubricate every machine properly. If the buyer uses the wrong grade for his equipment, he will be disappointed—and will probably blame it on the quality of our products.

Thus, we would lose a customer who might easily have become a constant purchaser if he had known how to select the right grade for his purpose. And the customer loses the satisfaction and the reduced operating costs that he might have secured by using the correct grades of lubricants.

Therefore, it is with a motive which is primarily selfish that we offer to our customers the services of our lubricating engineers. When our engineers have made a survey of a plant, and have recommended the grades of oils and greases that are exactly suited to its equipment, we know that the customer is going to be satisfied, and that we can count on him to become a steady purchaser.

This service, which we have established for our own protection, is also a benefit to the customer, for it enables him to get full satisfaction from the products he buys, and to enjoy all the advantages and savings that result from perfect lubrication of his machinery.

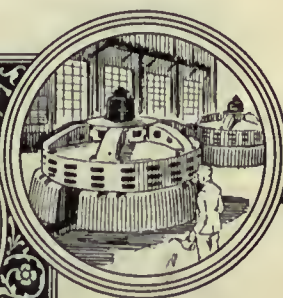
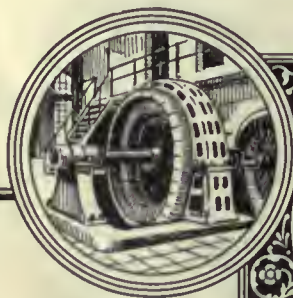
*We shall be glad to make a survey of YOUR plant
if you will phone or write us. The service is free*

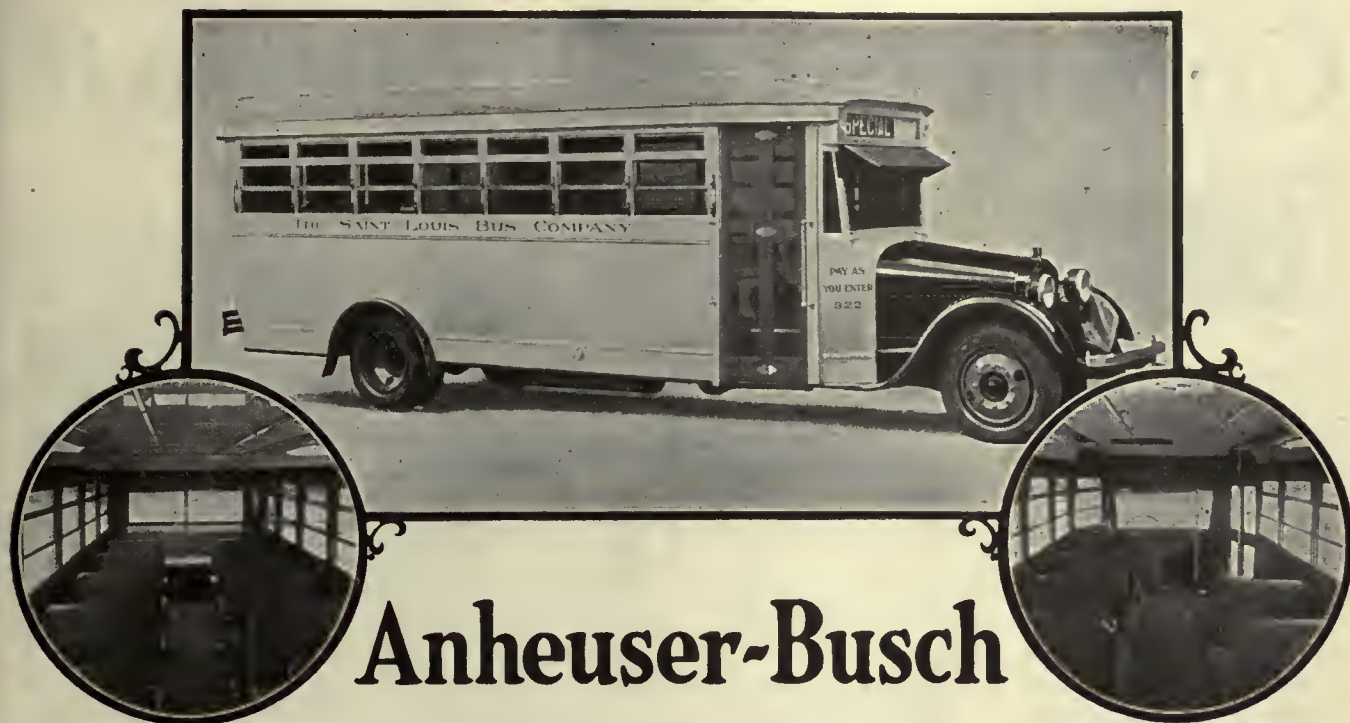
STANDARD OIL COMPANY

(Indiana)

General Offices: 910 S. Michigan Avenue

Chicago, Illinois





Anheuser-Busch bodies chosen for St. Louis busses

Four real bus transportation salesmen have recently entered the service of the St. Louis Bus Company. They're the four pay-enter bus bodies designed and built by Anheuser-Busch.

Each carries 29 passengers, who enter thru wide, double folding doors, pay as they get in, and reach their seats by means of a wide, commodious aisle, without stepping over the knees of other passengers.

Even on darkest days, each passenger can read as he rides, for conveniently located lamps flood the entire interior with clear, white light. Snug protection or ample ventilation is provided by clear-vision windows that close tight or can be raised to let cooling breezes in.

Long ago officials of the St. Louis Bus Company realized that it is the bus body

that sells the service. And they made sure of a double advantage when they placed the responsibility for the new St. Louis bus bodies with this organization.

They made sure of bus bodies built by an organization which has been building finest vehicles for more than forty years. Bus bodies that look comfortable . . . that look safe . . . that look pleasant to ride in.

Any bus operator who is interested in better bus bodies will find much of interest in the handsomely illustrated booklet we will gladly send on request.

It gives complete details of the various types of bus bodies Anheuser-Busch builds—lists equipment and other wanted information.

Sent free. Write for it. Address the

VEHICLE DEPARTMENT, ANHEUSER-BUSCH, ST. LOUIS

Anheuser-Busch Bus Bodies

Cool joints do not fail

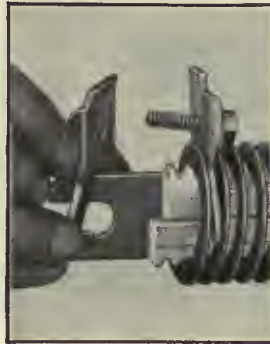


Monitor Edgewound Resistor assembled

JOINTS are weak points in the ordinary resistor. Poor joints mean excessive resistance, undue heating and possible burn-outs particularly in ribbon resistors. It is difficult to make and maintain good joints. Cast-iron grid resistors have about fifty joints in series in each section.

There are no series joints in Monitor Edgewound Resistors except where one unit is joined to the next. Where taps or terminals occur the joint is made with a powerful clamp which contacts completely with the ribbon.

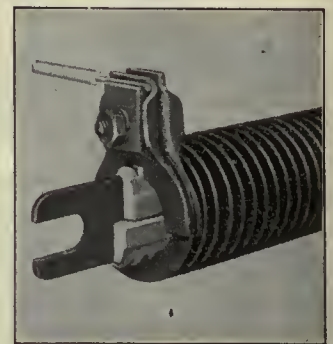
This is only one of the many superior features of Monitor Edgewound Resistors. Ask for bulletin describing the other advantages of Monitor Edgewound Resistors.



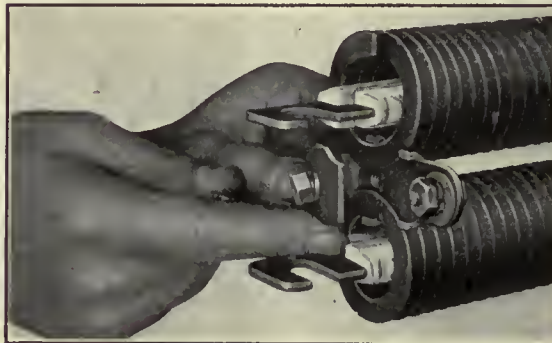
Method of making terminal connections on Monitor Edgewound Resistors.



This method of attaching wires insures a good, mechanically strong connection.



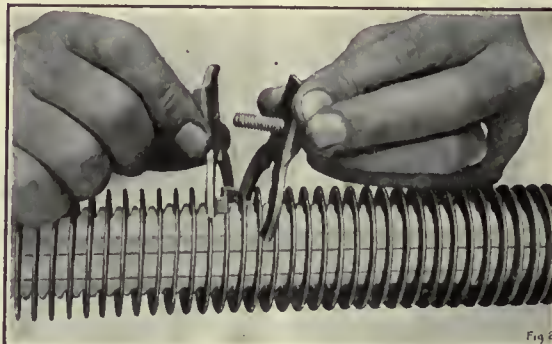
Terminal connection in place. The clamp terminal is rigid and will not work loose.



Method of joining adjacent Monitor Edgewound Resistor Units together electrically.



Bridging clamp in place. Note the terminal used for taking off tap.



Method of taking off tap on Monitor Edgewound Resistor. Tap can be placed at any point. Same type of clamp used as for terminals.



Tapped resistor unit. Clamp takes firm, rigid grip on ribbon and cannot work loose.

Monitor Controller Company

BALTIMORE, MARYLAND

BIRMINGHAM
DETROIT

BOSTON
NEW ORLEANS

BUFFALO
NEW YORK

CHICAGO
PHILADELPHIA

CINCINNATI
PITTSBURGH

CLEVELAND
ST. LOUIS

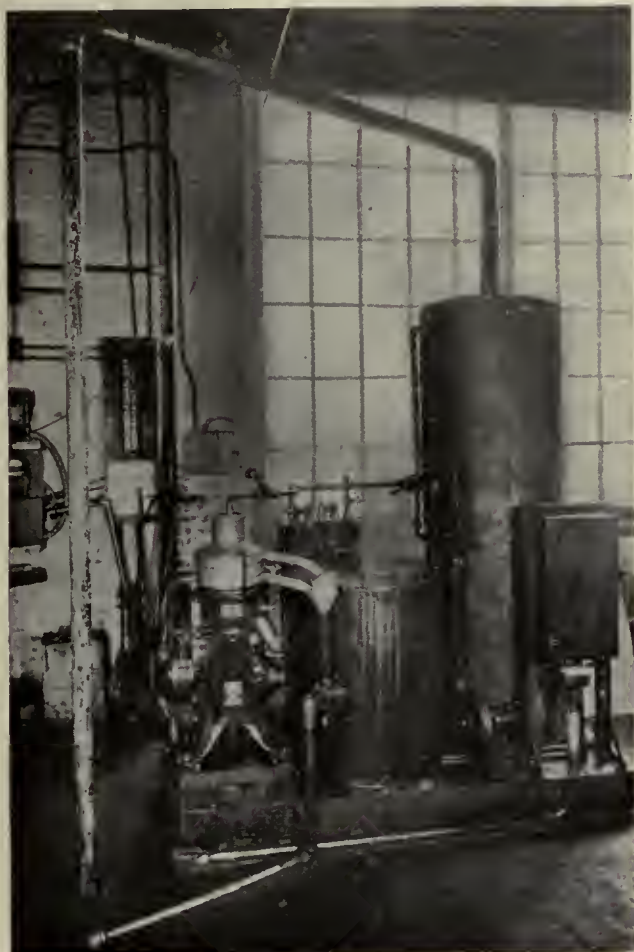
WASHINGTON

The Original
Just Press a Button[®] System

Monitor Edgewound Resistor

The best crankcase oil at 10 to 18 cents a gallon

Car Axle Oil
reclaimed with profit, too



The Yellow Cab Company, of Philadelphia, has used the De Laval Crankcase Oil Reclaiming Outfit shown above for about six months. It has recovered about 1000 gallons of oil each month and the total cost of recovery has averaged one-third the cost of new oil. Purification is so complete that new oil and reclaimed oil are stored in a common tank. Recovery averages 88%, the remaining 12% consisting of dilution, carbon, etc.

With the De Laval Crankcase Oil Reclaiming Outfit you can reduce the cost of lubricating the motors of your trucks, cabs or buses 40 to 70 per cent—depending on the size of your fleet and the price you pay for oil. In addition, you can use better oil or drain oftener and still save money while materially reducing engine wear.

Street railway companies which operate buses can install a combination outfit capable of reclaiming both crankcase oil and car axle oil and thus materially reduce their yearly cost of lubricating rolling stock, while keeping it in more dependable operating condition.

Oil reclaimed by the De Laval Outfit is considered by the engineers of leading oil companies to be in every way as efficient as brand-new oil. It is free from carbon and other abrasive matter and tests practically the same as new oil as regards flash, fire and viscosity.

For all practical purposes, the oil coming from the De Laval Reclaiming Outfit is refined. Yet the process is so simple and the Outfit so fool-proof that it is easily handled by ordinary garage help—often in spare time.

You can probably save enough oil to pay for the De Laval Outfit in a year or less. Mail the coupon in order that you may be fully posted on this important development in the automotive industry.

The De Laval Separator Company

165 Broadway, New York 600 Jackson Blvd., Chicago

DE LAVAL PACIFIC COMPANY
San Francisco

De Laval

Crankcase Oil Reclaiming Outfit

We are interested in obtaining more efficient crankcase lubrication at lower cost. Please send full information.

Company

Individual ERJ-614A

Address

American BROWN BOVERI

Power Rectifiers Efficient in Sub-Station Service under extreme load variation

Widely used in Europe for a number of years, Mercury-Arc Power Rectifiers have found their most popular application in the electric railway field. Their ability to effectively handle the fluctuations in load on railway lines without material loss in efficiency, from no-load, to high overload, is proved. There is no inertia of heavy rotating parts to be overcome.

On the accompanying chart are curves showing the comparative efficiencies of the three classes of conversion equipment—Rectifiers, Rotaries and Motor-Generators. This data was developed from actual tests. Note the great advantage of the mercury-arc rectifier at one-quarter load, an ordi-

nary condition on traction lines in non-rush hours.

Other advantages of the Mercury-Arc Power Rectifier are:—absolutely quiet operation, no moving parts except small auxiliaries, adaptable to full automatic operation, minimum maintenance required.

Further details of the principles, construction and operating features of this equipment will be given in subsequent advertisements.

Brown Boveri engineers have developed the Mercury-Arc Power Rectifier to a high degree of perfection in Europe. We are now prepared to build and install this type of equipment in America.

Products of American Brown Boveri Electric Corporation

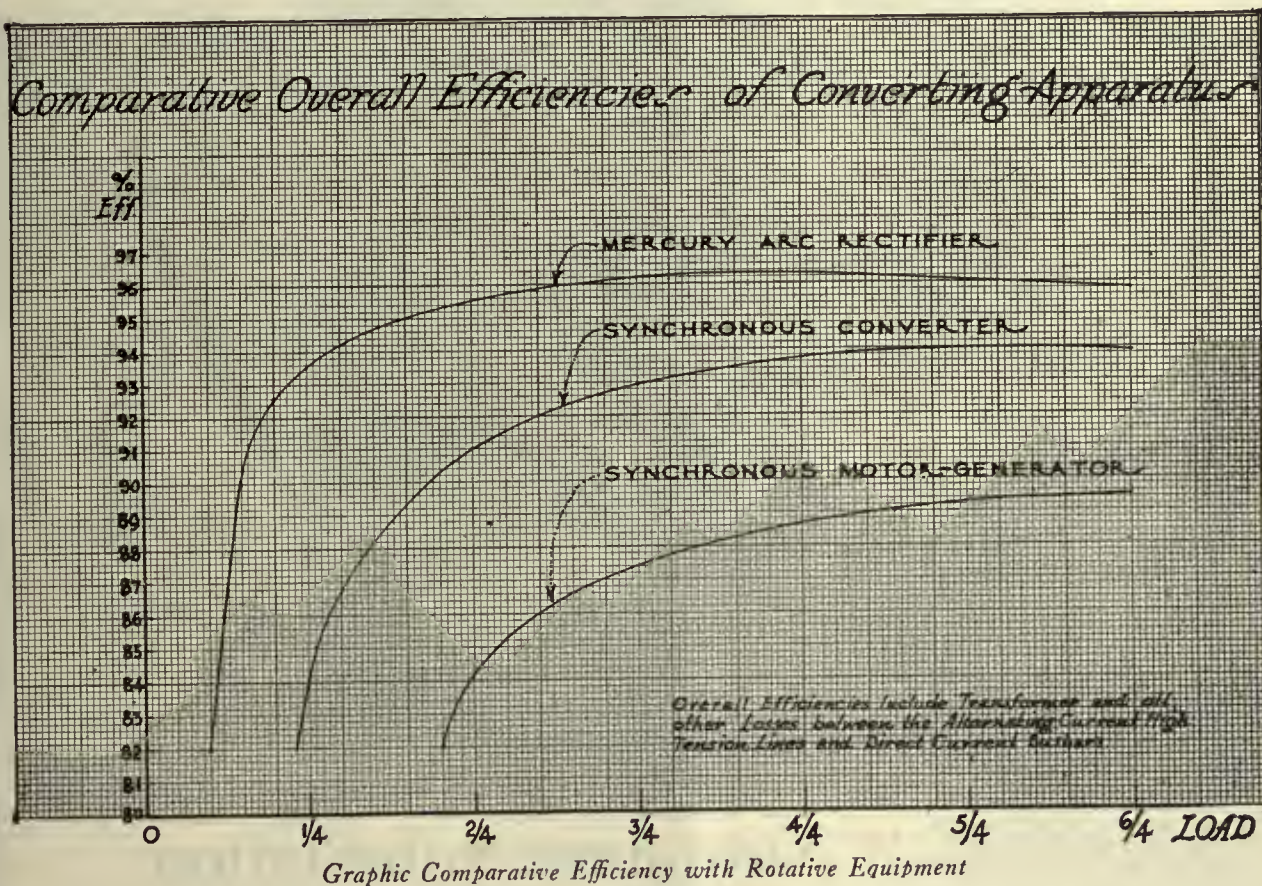
*Electric Locomotives
for any system of current, high or low
tensions
Complete Equipment
for railway electrification
Mercury-Arc Power Rectifiers
(steel enclosed)
Diesel-Electric Locomotives
Mining Locomotives*

*Motors (all sizes and types)
Rotary Converters
Motor Generators
Transformers (power or current)
Switches, Controllers
and all Auxiliary Equipment
Oil Switches
Condensers and Auxiliaries*

*Steam Turbo Generators
for normal or high pressures and
superheats
Automatic Regulators
Relays
Turbo Compressors and Blowers
Electric Furnaces
Induction Regulators*

Mercury-Arc Steel enclosed POWER RECTIFIERS

for sub-station service



Mercury-Arc Power Rectifiers pay for themselves quickly where D.C. load factor is variable or low.

In addition to their recognized position in the railway field, they can advantageously replace rotating equipment in Cen-

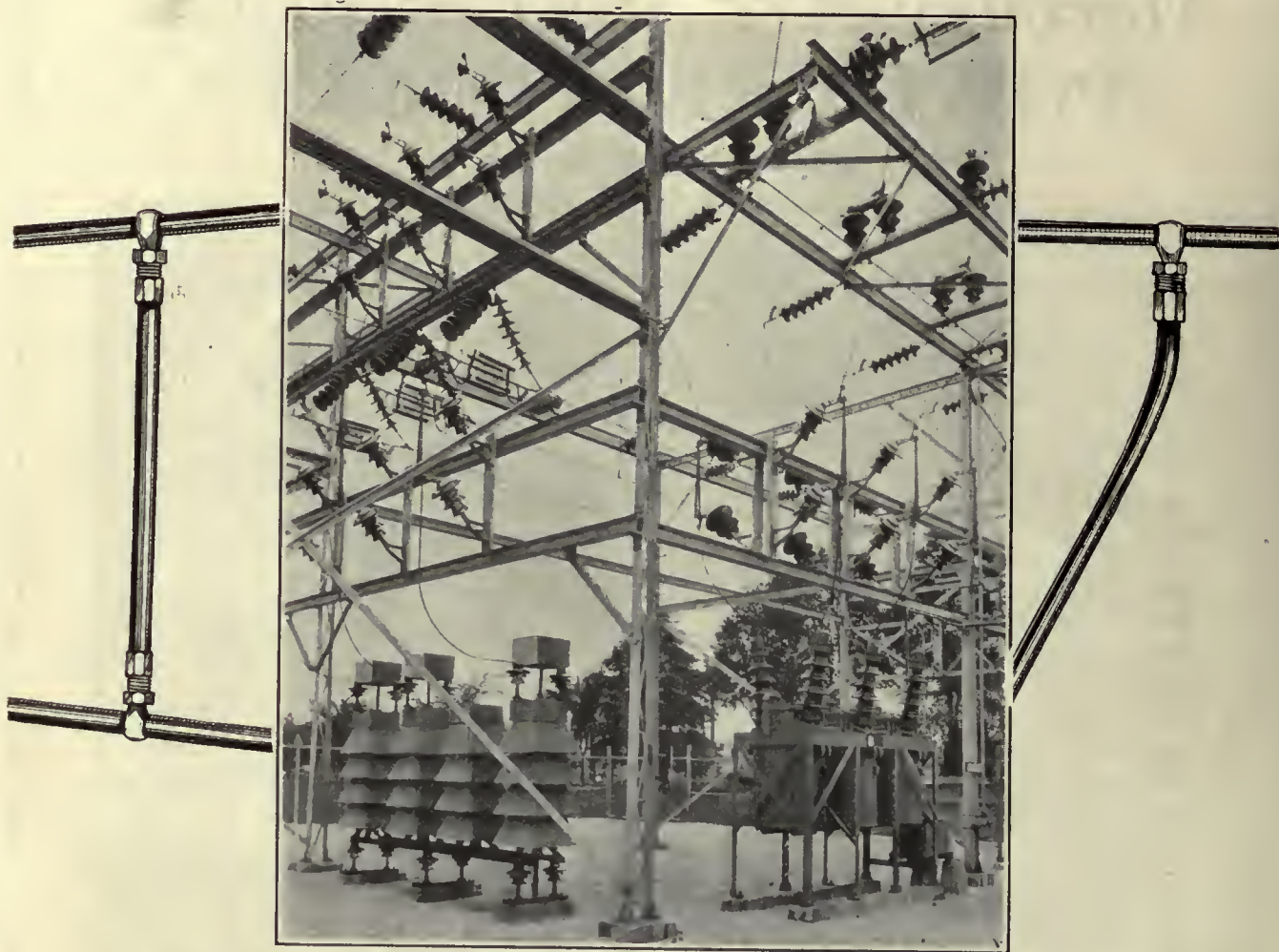
tral Station distribution and industrial application, not only because of their great efficiency, but because they are noiseless in operation, cause no vibration, do not require special foundation and occupy a minimum of space.

American Brown Boveri Electric Corporation

Plants at Camden, New Jersey

Main Office: 165 Broadway, New York

Note the Dosserts



33,000 Volt Automatic Sub-Station of the Toledo Edison Company

Dosserts are of course the standardized method of connections in the power plants and substations of central stations and electric railways.

The Toledo Edison Company uses Dosserts also on its 23,000 and 66,000 volt outdoor substations.

There are more than a thousand types, sizes and combinations shown in the Dossert 20th year book.

Write for copy.

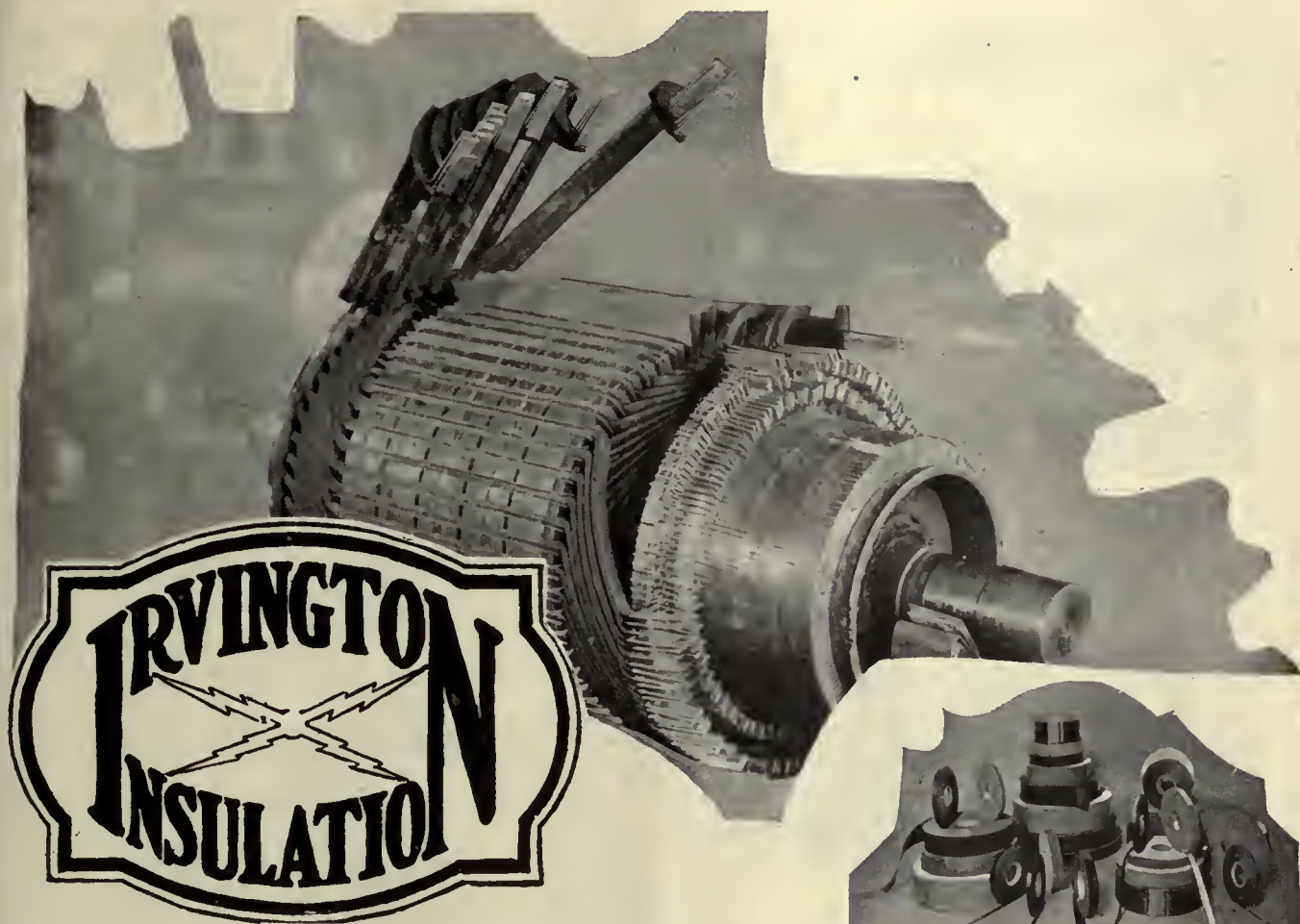
DOSSERT & CO.

H. B. Logan, Pres.

242 West 41st St., New York

DOSSERT

SOLDERLESS CONNECTIONS



—for positive protection

For more than twenty years Irvington Insulating Products have been specified by leaders in the electrical industry. They are recognized in most shops as "The World's Standard."

Having built up business on a basis of high quality—the Irvington Varnish & Insulator Company is today the largest producer in the world of flexible varnished insulations.

If you are not already familiar with our line of products, ask for samples to try in your shop—also for our 64-page book on Irvington Insulation.

Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper
Irv-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.

Sales Representatives:

Mitchell-Rand Mfg. Co., New York
 T. C. White Electrical Supply Co., St. Louis
 E. M. Wolcott, Rochester
 Martin Woodard, Seattle

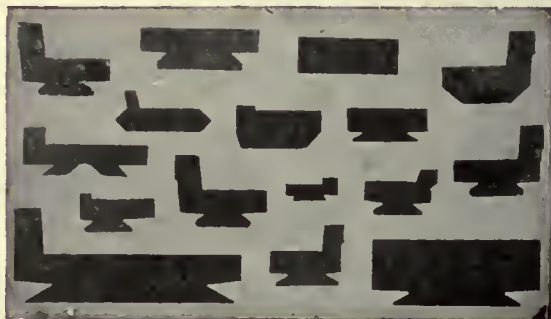
Prehler Bros., Chicago
 Consumers Rubber Co., Cleveland
 Clapp & Lamoree, Los Angeles
 F. G. Scofield, Toronto



Seven factors of Quality

High Dielectric Strength	Non-Hygroscopic
High Resistance	Heat Resisting
Flexibility	Chemically Neutral
Maximum Elasticity	

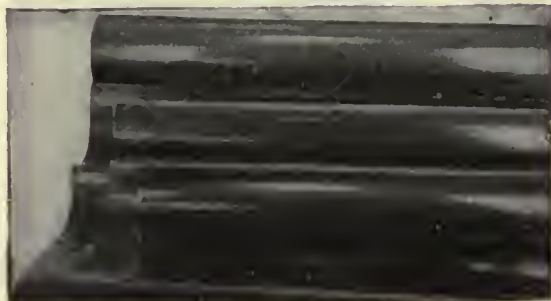
PERFECT
MICANITE
INSULATOR
REG. U.S. PAT. OFF.



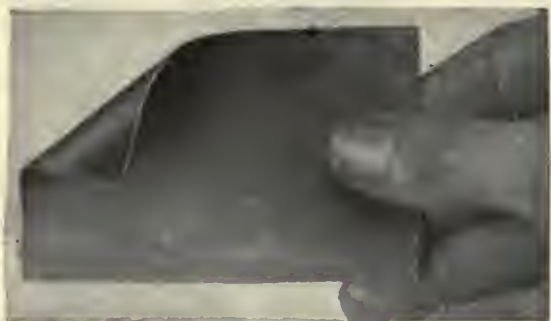
Micanite Commutator Segments



Micanite Commutator Rings



Empire Oiled Cloth



Armatite for Slots—2 Insulations in 1

PERFECT
EMPIRE
INSULATOR
REG. U.S. PAT. OFF.

QUALITY INSULATIONS

UNFAILINGLY
DEPENDABLE

ALWAYS UNIFORM
IN QUALITY

FOR OVER
30 YEARS

WRITE FOR A COPY
OF THIS HELPFUL BOOKLET

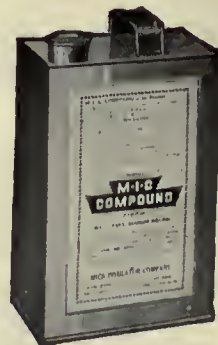
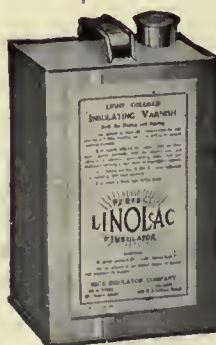
"Commutator Insulation and Assembly" is a booklet of practical and helpful information especially prepared for motor repairmen.

It describes the most up-to-date and experience-proved methods of insulating and assembling commutators and, in addition, commutator troubles and how to best overcome them.

MICA INSULATOR COMPANY

Sole Manufacturers of Micanite
Established 1893

New York Office: 68 Church St.
Chicago Office: 542 So. Dearborn St.
Works: Schenectady, N. Y.
Canadian Office: Victoriaville
Representatives in Principal Cities



FREE—THIS USEFUL CHART

Contains Data on Tap Drill Sizes, Inch Equivalents (In 64ths) Twist Drills, Machine Screws, Copper Wire, Etc., Etc.

Printed On Heavy Paper With A Washable Surface. Size 18 in. x 25 in.

The M-R WALL SHEET

TAP DRILL SIZES

The table of standard sizes for the use of drill bits with the various taps has been prepared by the American Institute of Mechanical Engineers. The table is based on the standard sizes for the use of drill bits with the various taps. The table is based on the standard sizes for the use of drill bits with the various taps.

INCH EQUIVALENTS

COPPER WIRE CARD

ALLOWABLE CARRYING CAPACITIES OF COPPER WIRE AND CABLES

CONDENSED TABLES

CHAMBERLAIN'S LAW

COMPARISON OF THERMOMETRIC SCALES

LAW OF COSINES

COMMON INSULATING MATERIALS

FREE HANDBOOK OF INSULATION

PRICE SCHEDULE SERVICE

WRITE FOR HANDBOOK AND BULLETIN SERVICE

Mitchell-Rand Mfg. Co.
28 Vesey Street, New York, N. Y.

EPITOMIZED COMMENTS

"Only a few days ago I wanted to know the diameter in inches of a No. 26 drill and I would have been saved a good deal of time and bother if I had had your chart at the time."

"On one sheet you have gathered together tables of data that heretofore were available to us only after search through several textbooks."

"You did a very fine job on this and I do not think of anything just now for its improvement."

"It is certainly a very nice piece of work and will surely be helpful to a great many men in this shop."

"I think this is a very well executed production and am planning to use it in our design room."

"To know what drill to use for a certain tap is invaluable information to any shopman."

"Are the tables helpful? Absolutely!"

The primary purpose of this chart is, of course, to keep our name before the users of electrical insulation, insulating compounds, paints, etc., and to such concerns the M-R Wall Sheet will be sent free of charge when request is made on business letterhead or is accompanied by business card.

Individuals or concerns who have no interest in materials such as we manufacture are requested to inclose 15c. in stamps or coin to cover cost of package and postage.

MITCHELL-RAND MFG. CO. 15 VESEY ST. NEW YORK, N. Y.

ALUMINUM

CAR STRUCTURE

High-strength aluminum alloys are furnished in the form of sheet, sand- and die-castings, permanent-mold castings, tubing, rivets, moulding, etc.

The use of high-strength aluminum has in some cases reduced first-cost and has always rendered reduced weight with consequent savings in haulage. Rust cannot harm its continued good appearance.

A. C. S. R.

Aluminum Cable, Steel Reinforced, is remarkable for its lightness, strength and great reliability in service. Having a large proportion of steel, it is the ideal material for a main catenary or messenger cable because it combines the functions of messenger and feeder in one cable.

In A.C.S.R. the aluminum strands provide the necessary electrical conductivity and give the steel core positive and permanent protection against corrosion.

CONDUIT

Its weight is about $\frac{1}{3}$ that of ordinary metal conduit. The 1 in. size weighs only .6 lbs. per ft.; the $\frac{1}{2}$ in. size only .3 lbs.

Cars in service along the seaboard, or where chemical fumes corrode other metals, should be fitted with aluminum conduit, not only for lightness, but for length of life. Aluminum is unusually resistant to common corrosive agents, and its length of service under severe conditions is responsible for its satisfactory use.

Booklets sent on request cover Strong Alloys, Conduit, Radio, Casting Alloys, etc. Please mention the field in which you are interested.

ALUMINUM COMPANY OF AMERICA
OLIVER BUILDING, PITTSBURGH, PENNA.

Makers of Aluminum in Every Commercial Form



Where *Service* is most *Exacting*



WIRE PRODUCTS

Copper Wire
Solid or Stranded
Bare, Weatherproof
and Slow Burning

Varnished
Cambric Cable
Lead and Braid Covered
Paper Lead Cable
Trolley Wire
Copper and Hitenso

Where traffic is heavy much longer service can be obtained by the use of "Hitenso A" Trolley Wire. 3/0 B & S Grooved has a tensile strength of 60,000 lbs. per square inch and a conductivity of 80%. It meets and exceeds the requirements of the A. S. T. M. specifications for 65% conductivity high strength bronze.

Because quality means economy in equipment upkeep, it pays to use "Hitenso A".

ANACONDA COPPER MINING CO.
THE AMERICAN BRASS COMPANY

Rod, Wire and Cable Products

General Offices: 25 Broadway, New York

Chicago Office: 111 W. Washington St.

ANACONDA TROLLEY WIRE



Miller Trolley Shoes

Pacific-Northwest Traction Co.

Knoxville Ry. & Lt. Co.

Waterloo, Cedar Falls
& Northern Ry. Co.





Constant contact throughout the year—

In all kinds of weather—through rain, sleet and snowstorms of the worst kind—Miller Trolley Shoes hold firmly against the wire. Around sharp curves and over switches at high speeds they hold the wire. How? Because of the sliding contact.

This sliding contact prevents jumping the wire under dangerous conditions such as:—

When a car approaches a railroad crossing—when at night a car would be left in total darkness—where in heavy traffic delays are serious.

Among the many advantages of this sliding contact are the fact that it reduces noise, reduces wire wear, prevents arcing, and increases the amount of current drafts efficiently handled.

As indicated by the illustrations shown below, many well-known roads are now using Miller Trolley Shoes.

Investigate the economies and safety features of these shoes as applied to your road.

Miller Trolley Shoe Company

295 Columbia Road

Boston 21, Mass.

Hudson Valley Ry. Co.

Chicago, North Shore,
Milwaukee R. R.



Portland-Lewiston
Interurban





Good Retrievers never fail—

When a hunter hits a bird in full flight he must rely on his retriever to bring the bird in. Likewise after the trolley has jumped the wire the operator of a speeding electric car must rely on the retriever to pull the pole in.

The hunter depends on his favorite hound—the railway operator on an Earll.

Neither retriever fails.

Five points that hit the mark—

Earll Trolley Catchers and Retrievers have five points of superiority which make them sure performers under all conditions.

1. No-Wear check pawl—short, simple and sturdy—always engages full face on, never strikes point of teeth.
2. Free winding tension spring handles wet rope just as easily and efficiently as dry.
3. Ratchet wind simplifies retriever winding, saves time and trouble.
4. Emergency release permits of trolley being run up again instantly at any speed in case of emergency.
5. Perfect and automatic lubrication of every part through one oil hole once in three months.

Ask for a sample catcher or retriever. Then you can test it under your own conditions.

EARLL

Trolley Catchers and Retrievers

*Light-weight
Quick-acting
Simple*

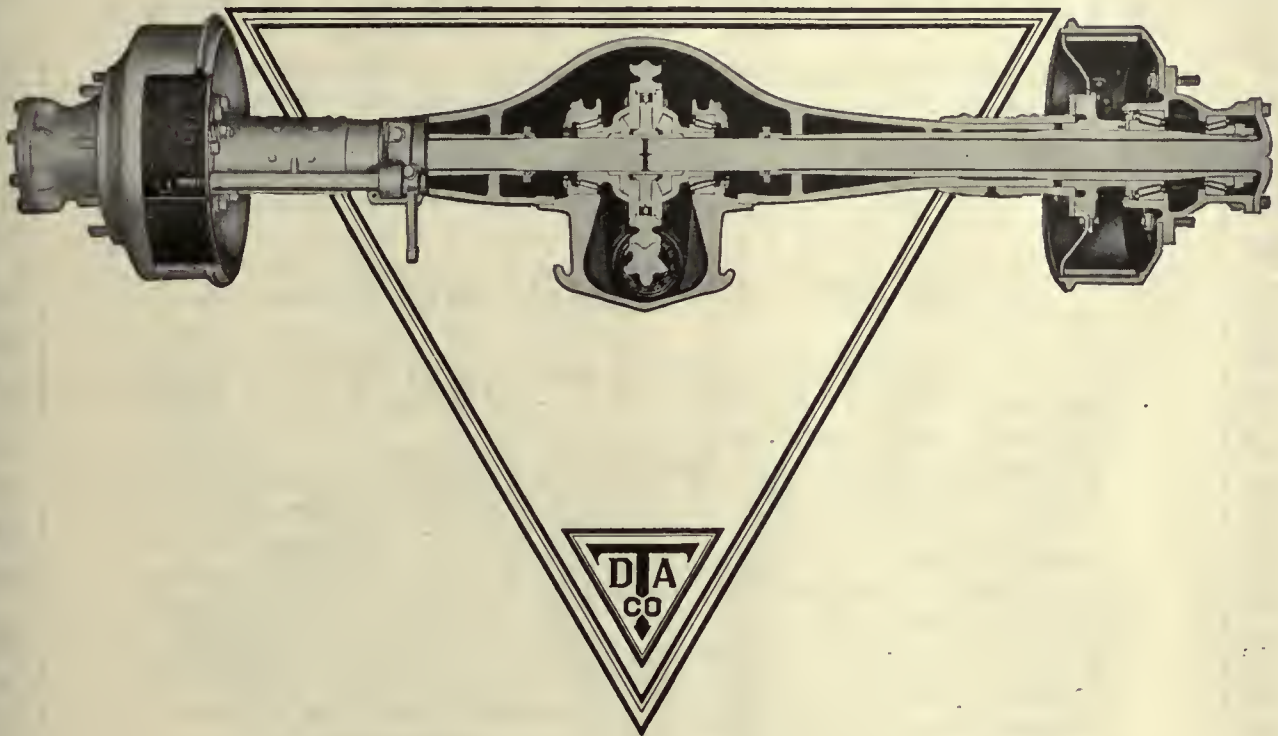
C. I. EARLL, York, Pa.

Canadian Agents:

Railway & Power Engineering Corp., Ltd., Toronto, Ont.
In All Other Foreign Countries:
International General Electric Co., Schenectady, N. Y.



TIMKEN



Quality is the result of honest effort backed by long experience and ample resources.

Good Will is the result of Quality — and, once acquired, represents so great an expenditure of time and money that good business dictates it must forever be maintained.

(30)

THE TIMKEN-DETROIT AXLE COMPANY, DETROIT, MICHIGAN

AXLES

SHULER

FRONT AXLES

From the very beginning, through many years of successful service to manufacturers, all the efforts of the Shuler organization have been concentrated upon the development and perfection of only one major unit—the Front Axle.

We realize that there is no major part more vital to the safety of any motor vehicle and its human or material freight, than the part we have chosen to make.

Appreciating the responsibility we assume, we have made a most careful study of the requirements in every field of Front Axle service which we have entered and have cooperated to the fullest degree with the manufacturers. Combining their ideas and experience with ours, we have developed our designs to meet their particular demands.

It is only logical and inevitable that such specialization in engineering and manufacturing, and such cooperation between manufacturer and parts-maker, should produce a distinctly superior Front Axle which would meet every emergency and which would serve with equal assurance of safety and efficiency.

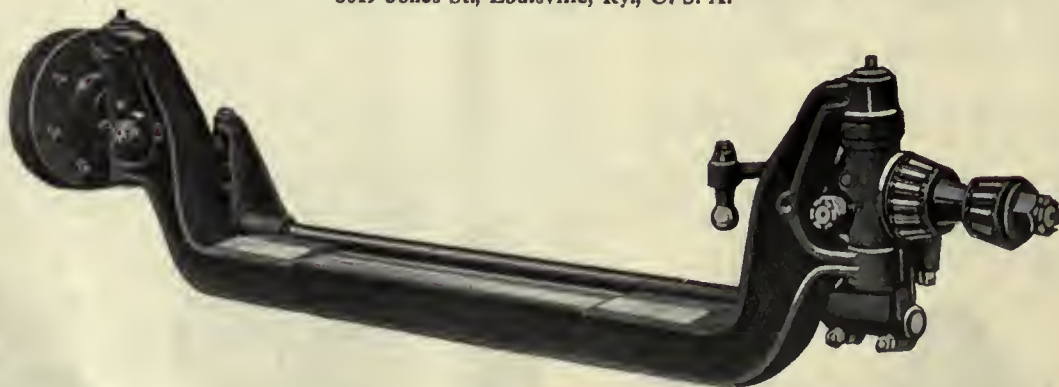
We are the originator and pioneer manufacturer of a Front Axle specially designed for motor bus service—an axle now specified by the foremost designers and used by the leading manufacturers—a product that any manufacturer can stand behind and guarantee as if it were made in his own plant and under his own supervision.

We offer a complete line of Front Axles for motor busses, motor trucks, tractors and trailers, embodying maximum efficiency in the product and real service in the factory behind it.

Our representatives, at the Vanderbilt in New York and at the Blackstone in Chicago, will be glad to talk with manufacturers regarding their 1926 requirements,—placing at your disposal all our resources and experience, and the complete cooperation of our engineering staff.

SHULER AXLE COMPANY, Incorporated

3019 Jones St., Louisville, Ky., U. S. A.



Better finish in less time!

Nitro-VALSPAR

PRIMER

GUNGLAZE

ENAMEL

NO WEAK LINK

Nitro-Valspar Means
Faster Finishing
Every Coat
Lacquer
You Save
Time
Money
and
Space
!

VALENTINE'S AUTOMOBILE
FINISHES

Nitro-Valspar—Valentine's Varnishes
Valspar-Enamels



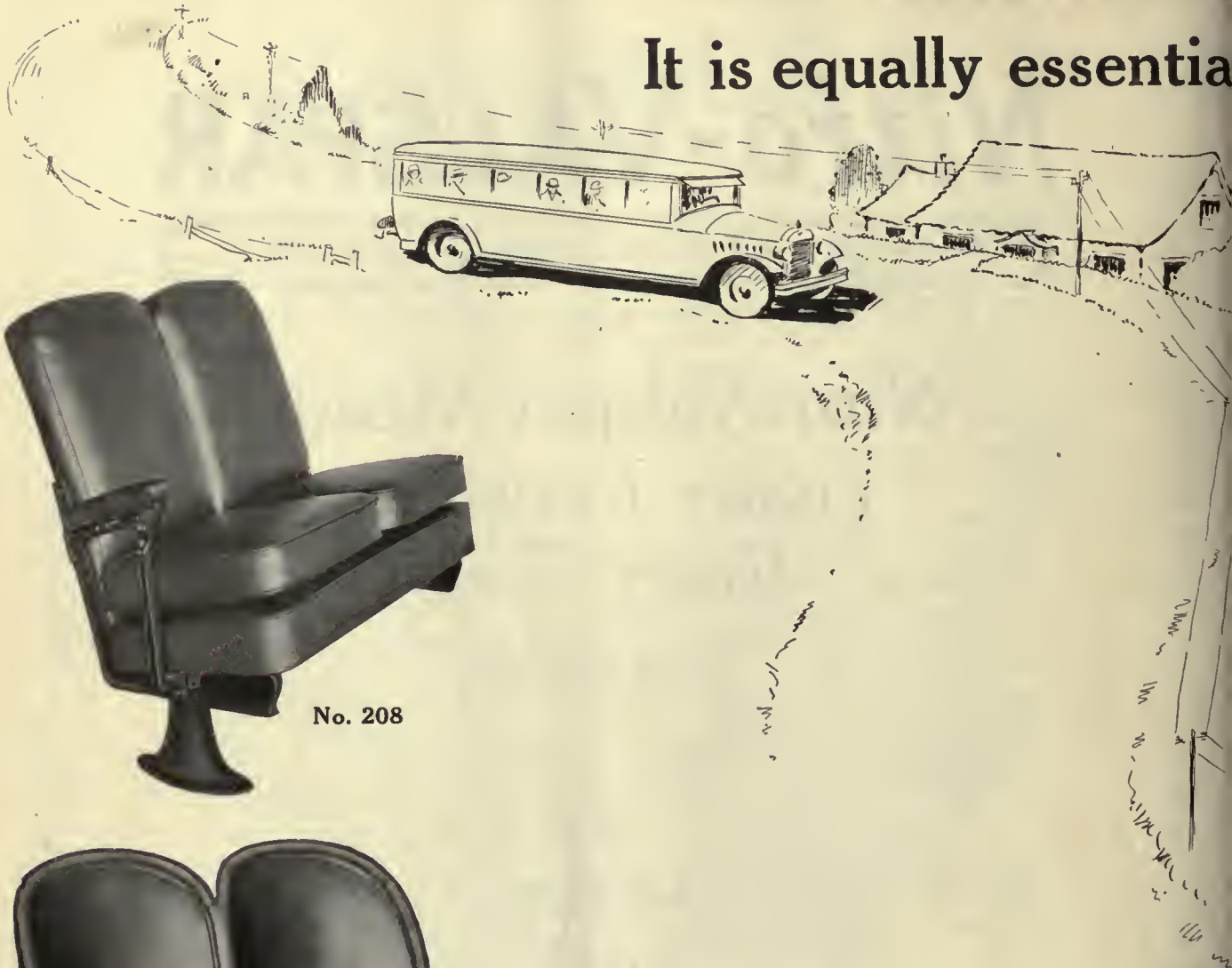
VALENTINE & COMPANY

*Largest Manufacturers of High-Grade Varnishes in the
World—Established 1832*

New York—456 Fourth Ave. Boston—49 Purchase St.
Chicago—343 South Dearborn St.
Detroit—10-254 General Motors Bldg.
W. P. Fuller & Co., Pacific Coast

Co-ordinate

It is equally essential



No. 208



No. 900A

Typical Bus Seats

No. 208—De Luxe with divided back, spring cushion and air-cushion pads.

No. 900A—Double Chair with individual back and spring cushion pads.

Typical Car Seats

No. 392EE—With mahogany capped armrest, and extra high three-part headroll.

No. 199F Special—Plush seat with thickly upholstered spring edge cushion and detachable back.

Hale and Kilburn SEATS

Comfort!

both bus and car

Co-ordinated comfort, as represented by Hale-Kilburn Seats, is now available for both cars and buses in every type of service — urban, suburban and interurban.

With a half century of experience in the design of comfortable, practical seats for railway cars as a background, Hale-Kilburn now offers an equivalent line of bus seats which are rapidly becoming standard equipment in this new field of transportation.

*Your request will bring a copy of our catalog
—also prices if desired.*

HALE-KILBURN COMPANY

General Offices and Works:

1800 Lehigh Avenue, Philadelphia

SALES OFFICES:

Hale-Kilburn Co., 30 Church St., New York
Hale-Kilburn Co., McCormick Bldg., Chicago
Equipment Sales Corp'n, Railway Exchange
Bldg., St. Louis
E. A. Thornwell, Candler Bldg., Atlanta
Frank F. Bodler, 903 Monadnock Bldg., San
Francisco

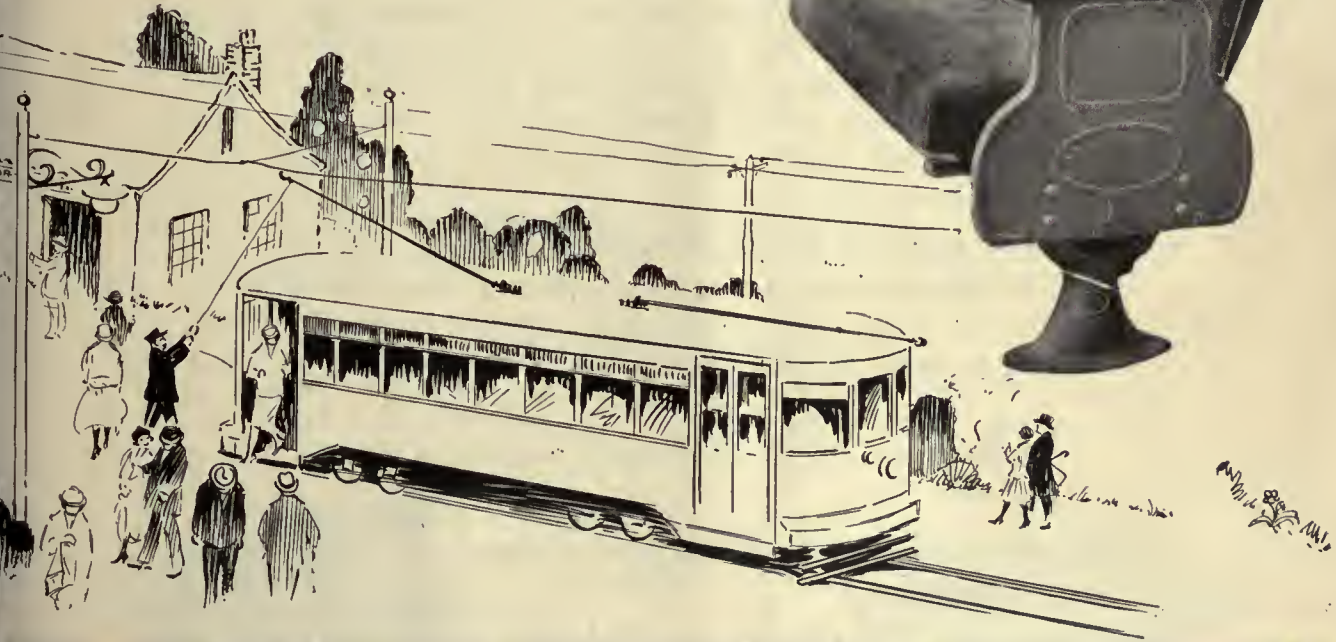
Chris Eccles, 320 S. San Pedro St., Los
Angeles
T. C. Coleman & Son, Starks Bldg., Louisville
W. L. Jefferies, Jr., Mutual Bldg., Richmond
W. D. Jenkins, Praetorian Bldg., Dallas, Texas
W. D. Jenkins, Carter Bldg., Houston, Texas
H. M. Euler, 46 Front St., Portland, Oregon



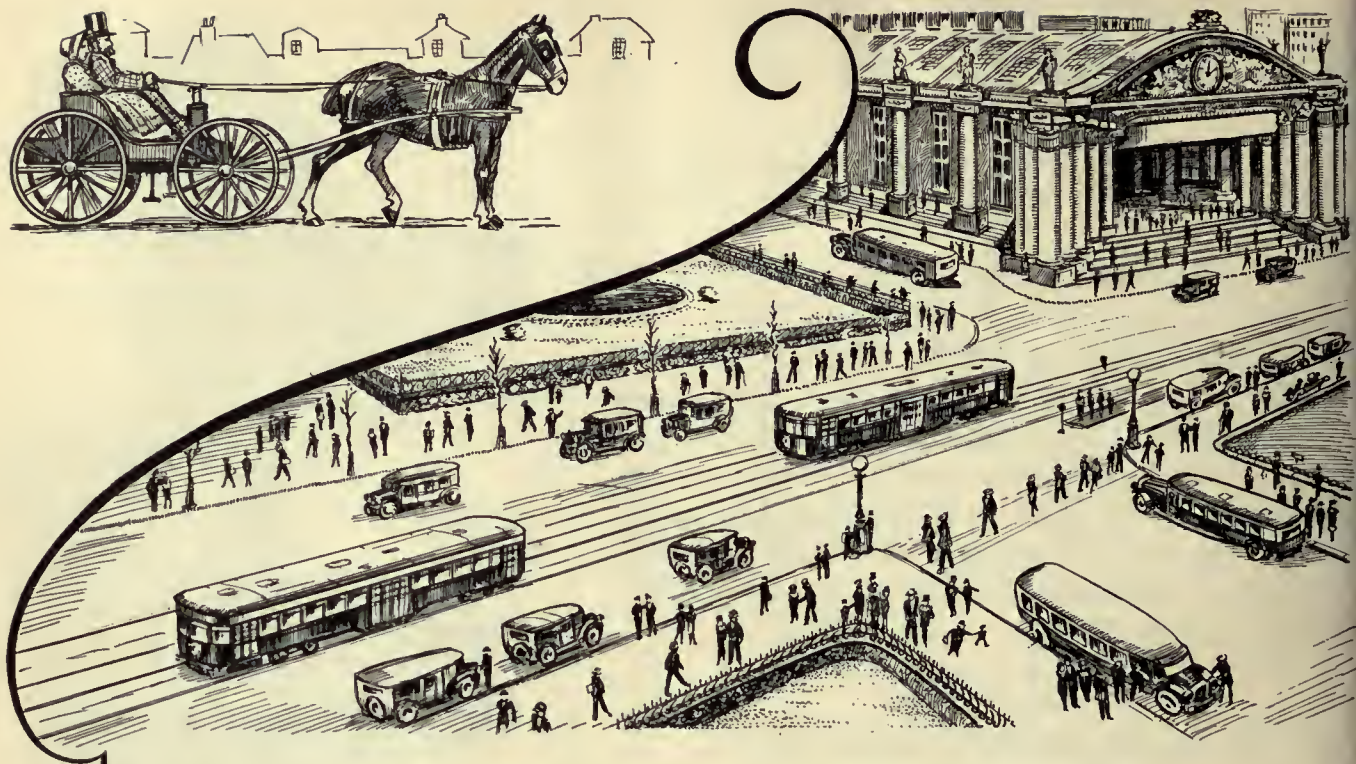
**No. 199F
Special**



No. 392 EE



Hale and Kilburn SEATS



From the early days of the buggy to modern railway cars and buses

Just as the old-time horse and buggy has been replaced by the automobile, the bus and the electric railway car, so have the requirements of finish changed. To be satisfactory and economical, the finish on a bus or railway car must not only be pleasing in appearance but it must be *permanent*—modern transportation requirements demand it.

More and more railway and bus companies are coming to realize that Egyptian Lacquer gives a finish that is both beautiful and permanent and at the lowest cost. Can be easily applied in successive hourly periods.

Consider what this means in your overhead, in the running time of your cars, in the maintenance costs—in your profits—

*We have manufactured lacquers exclusively for 50 years
and are at your service.*

The EGYPTIAN LACQUER MFG. CO.

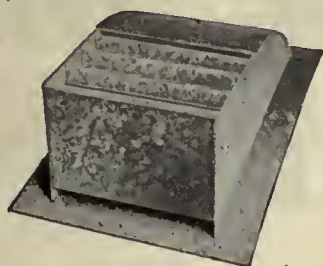
90 West St., New York

Chicago

Los Angeles

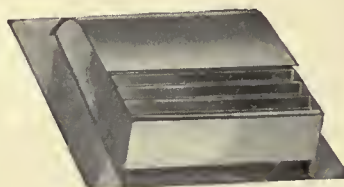
San Francisco

EGYPTIAN LACQUERS



Type "A" for Street Cars

For cars having a small roof radius. Made entirely of Armco galvanized sheet iron. Weight 6½ pounds. Like all N-L's absolutely noiseless, dust and weather proof.



Type "C" for Street Cars

Especially applicable to cars having a large roof radius. Lays low on roof. Made entirely of Armco galvanized sheet iron. Weight 6 pounds.

There's room in the passages for the exhaust

N-L water baffles do just what they're intended to do...they prevent the entrance of rain and storm. But their superiority lies in the fact that they do not choke up the air passages. Which accounts for the surprisingly high exhaust of N-L Ventilators.

THE NICHOLS-LINTERN CO.

7960 Lorain Avenue

Cleveland, Ohio

Represented in Canada by: Railway & Power Engr. Corp., Toronto, Ont.

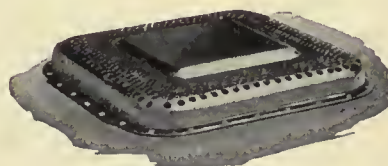
In Great Britain by United Automobile Services, Ltd., Lowestoft, England

In Australia, South Africa and Orient by: Nolan Smith & Co., Ltd., New York City



The "Dual" for Buses

The most powerful roof ventilator made. Regulative feature provides control to meet any weather condition. The only genuine year-round performer. Height when closed 1½-in., when fully opened 4½-in. Weight 4 pounds.



The "Aerating" for Buses

Similar to the "Dual" but relies entirely upon interior grill for regulation. Very high exhaust rate. Height above roof. 1½-in. Like the "Dual" designed for low clearance. Weight 2¾ pounds.

The Car [and Bus] of Tomorrow -the profit-making type will be largely built HASKELITE and PLYMETL because

Recent Installations of CARS and BUSES using HASKELITE Products

CUSTOMERS AMONG STREET RAILWAYS

Chicago, North Shore & Milwaukee Ry. Co., Milwaukee, Wis.

Denver Tramways, Denver, Colo.

Fort Smith Light & Traction Co., Fort Smith, Ark.

Milwaukee Elec. Ry. & Light Co., Milwaukee, Wis.

Pine Bluff Co., Pine Bluff, Ark.

Pittsburgh Railways, Pittsburgh, Pa.

United Traction Co., Albany, N. Y.

Buffalo Erie Ry. Co., Erie, Pa.

Chicago, Lake Shore & South Bend Ry., Michigan City, Indiana

Grand Rapids St. Ry. Co., Grand Rapids, Mich.

Indiana, Columbus & Eastern Trac. Co., Springfield, Ohio.

Municipal Railways of San Francisco, San Francisco, Calif.

Cars built by Cincinnati Car Co. with HASKELITE headlinings and interior linings.

HASKELITE ordered 9-15-25 for interior headlinings on street cars. Use HASKELITE for side panels and front and rear letter boards. Building cars with HASKELITE exterior side panels. 5-18-25.

HASKELITE ordered 9-18-25 for repair work.

PLYMETL used for side linings and HASKELITE for car seat bottoms. PLYMETL ordered 9-19-25 for repair work.

HASKELITE used for headlinings. Reconditioning old cars into DeLuxe type. HASKELITE used for interior trim. 4-8-25.

HASKELITE 10-27-25 for inside finish of parlor cars and coaches.

PLYMETL used for vestibule linings. PLYMETL 10-1-25, 10-14-25 for exterior side panels of cars.

100 cars with HASKELITE headlinings built by the Pressed Steel Car Co. 225 cars with HASKELITE headlinings and bulletin boards built by the Pressed Steel Car Co.

103 cars built by Osgood-Bradley with HASKELITE headlinings and hoods.

1925—Have over 500 HASKELITE cars in operation.

PLYMETL 8-14-25 for re-building car. PLYMETL 10-9-25 to be used for the sides of their 180 type cars in place of sheet steel.

14 cars built by Cincinnati Car Co. with HASKELITE interior linings and headlinings.

Have cars with HASKELITE ceilings. Rebuilding cars with HASKELITE linings. 4-9-25.

Use HASKELITE for roofs, headlinings, and interior linings. In April, 1925, had three sample cars built — one by Light Weight Noiseless Car Co. with HASKELITE roof, exterior side and end panels, linings and headlinings; one by the G. C. Kuhlman Car Co. with HASKELITE roof and PLYMETL sides, and another car by the St. Louis Car Co. with HASKELITE roof. EVE PLYMETL 9-8-25 for repair work.

Cars with HASKELITE roofs built by G. C. Kuhlman Car Co. Standardize on HASKELITE headlinings.

HASKELITE used for roofs of cars built by Bethlehem Shipbuilding Corp., Los Angeles, Calif., and American Car Co., St. Louis, Mo.

BUS BODY INSTALLATIONS

Boston Elevated Railway, Boston, Mass.

Boston & Worcester Street Railway, Framingham, Mass.

Cleveland Railway, Cleveland, Ohio

Connecticut Company, New Haven, Conn.

Kansas City Railway, Kansas City, Mo.

Milwaukee Elec. Ry. & Light Co., Milwaukee, Wis.

Mississippi Power & Light Co., Jackson, Miss.
Philadelphia Mutual Transit Co., Philadelphia, Pa.

Toronto Transportation Commission, Toronto, Ont., Canada.

Chevy Chase Coach Line, Washington, D. C.

Operate 49 Mack buses. HASKELITE roofs. Three Yellow with HASKELITE headlinings 25 International Harvester with HASKELITE roofs.

Five International Harvester buses with HASKELITE roofs. Five Mack buses with HASKELITE roofs.

Twelve Yellow Coach buses with HASKELITE headlinings.

Thirty buses built by G. C. Kuhlman Car Company with HASKELITE roofs and PLYMETL sides. Fifty buses built on six wheel chassis with HASKELITE roofs, headlinings, floors, seats and interior lining.

Total 80 buses. Have a fleet of Mack buses with HASKELITE roofs. HASKELITE also used in the body. 12-23-24 Sept., 1925, purchased 13 Street Car type buses from Yellow Coach, HASKELITE roofs and headlinings.

Ordered 56 new buses, 38 being built by American Car Co. with HASKELITE roofs, headlinings and side linings. 18 being built by St. Louis Car Co. with HASKELITE roofs, headlinings and side linings.

Bodies mounted on Yellow, Mack and Six-Wheel chassis. Operate 3 type "Y" Yellow Parlor Coaches with HASKELITE headlinings, ad racks and rear corners.

Also 18 single deck buses with HASKELITE headlinings. Bought 40 buses with HASKELITE headlinings, 6-26-25. Using HASKELITE for interior of parlor cars built in own shop. 10-18-25.

7 buses built by Fageol with HASKELITE roofs and linings. Purchased 225 buses from Yellow Coach 150 of which are double-deckers with HASKELITE floors on upper deck and HASKELITE half roofs on upper deck. 75 are single-deckers with HASKELITE one-piece headlinings.

HASKELITE 9-25-25 used for repairs.

April 1, 1925—21 buses built by Yellow Coach Mfg. Co., with HASKELITE roofs and headlinings. Also operate buses built in own shops with HASKELITE roofs and PLYMETL sides.

Built 3 coaches in their own shop with HASKELITE mahogany panels.

8 parlor car special buses from Yellow Coach HASKELITE roofs and headlinings.

Details regarding many other Car and Bus installations recently made will be sent you upon request.

HASKELITE PLYMETL

Replaces heavier materials for roofs, headlinings side linings, bulkheads, interior trim and sub floors. It comes in single panels, as large as 23 by 9 feet, in various thicknesses, and for interior trim it is supplied with top ply of mahogany or walnut. Car roofs are formed of from three to five panels, with or without headlinings. Bus roofs are commonly made of single panels. By using Haskelite, the weight of a double truck car is reduced as much as 900 pounds. Wherever Haskelite is used, strength is increased, weight decreased, and time and labor expense is greatly reduced.

Replaces sheet metal for exterior panels on cars and buses, with a marked reduction in weight. Plymetl resists indentation more effectively than steel, takes a high quality of finish with fewer paint coats. It has many times greater resistance to heat and cold, than sheet steel, and is used for side panels on many types of cars and buses without inner linings. Plymetl is furnished in large panels, is easily worked and can be bent to curves of moderate radius in common tinnern rolls. It can be screwed or glued to wooden frames, or hot riveted to steel. Plymetl resists buckling more effectively than sheet steel, and its use in side panels or, as in some cases as sub-floors, materially stiffens the car body while reducing weight.

Plymetl used on a double truck car saves as much as 900 pounds.

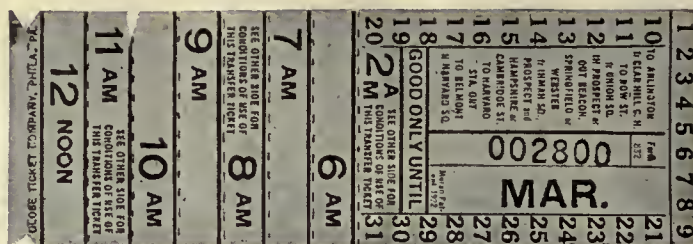


they make possible a form of construction especially suited to the demands of the new day

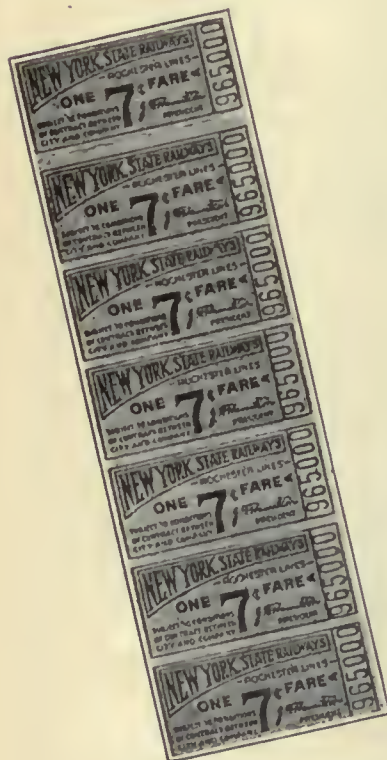
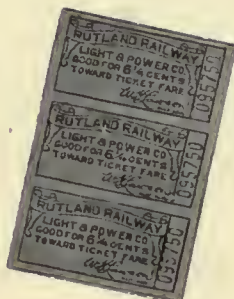
URBAN and interurban passenger transportation is on a decidedly different basis today than heretofore. The public is more critical and exacting yet is appreciative of improvements when they are made. Operating expenses must be reduced, revenues must be increased. The answer is more attractive, comfortable, and lighter weight cars and buses. The light weight car has become established as a means of reducing operating and maintenance expense. It also effects an increase in revenue by making possible better schedules and more trips.

Haskelite products, HASKELITE and PLYMETL, played a large part in making possible the modern light weight car and motor coach. They are furnished in single pieces of large area, thus reducing the number of joints — especially in roofs — and minimizing the labor of placing. Their outstanding characteristics of strength and light weight make them ideal materials for car and bus body construction. Their heat insulation value makes inner linings unnecessary in many cases, and the ease with which they can be given a high quality finish contributes much to the attractiveness of the vehicle. Operating companies having experience with Haskelite and Plymetl are specifying them for new cars. Builders of both cars and buses are standardizing on the use of Haskelite and Plymetl. Builder or operator — cars or buses, you will profit most under today's conditions by utilizing Haskelite and Plymetl transportation's dominant construction materials.

HASKELITE MANUFACTURING CORPORATION
133 WEST WASHINGTON STREET
CHICAGO, ILLINOIS



Moran Patent Transfer



Statistics Show that—

you can stop revenue losses due to transfer abuse by using the Moran Patent Transfer. Time limits are accurately fixed by tearing off the perforated coupons. A.M. and P.M. are instantly detected by using contrasting colors. Conductors can quickly issue and receive these transfers without making errors.

GLOBE

Tickets—Transfers—Passes

—of every description are designed by our specialists for all standard and special requirements.

Ask us to show you what we have done for others in the past—and what we can do for you in 1926.

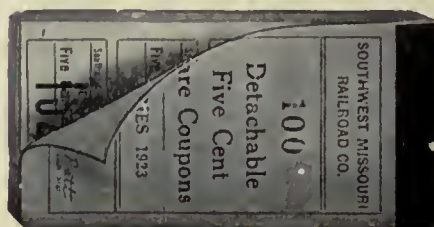
GLOBE TICKET COMPANY

116 N. 12th Street, Philadelphia, Pa.

Los Angeles

New York

San Francisco



100 · YEARS · OF · MANUFACTURING · EXPERIENCE ·



Comfortable H-W Car Seats Adapted to New or Renewal Equipment

THE demand for more attractive and comfortable Electric Railway seating equipment has been met in a practical way by Heywood-Wakefield car-seating engineers. Through improvements in appearance and construction, the H-W line has kept pace with the popular trend in modern car equipment.

The two seats shown are fine examples of the new reversible and non-reversible types of electric car seats. They represent what can be done in the re-seating of out-of-date equipment and the proper seating of the new.

No. 325-S. C. Special embodies luxurious comfort with unusually fine appearance. Seat and back are scientifically pitched for easy posture. Seats are of double, and backs of single spring construction. Upholstery may be of plush or genuine leather, as desired. Backs come 22 or 25 inches in height, with or without head-roll. Arm rests can be supplied.

Heywood-Wakefield seating experts, backed by 100 years' manufacturing experience, have given careful study to the new order of things in Electric Car seating. They are qualified to help you in many ways in the rehabilitation of your rolling stock. This consulting service is available to you without charge through any H-W sales office.

Stocks of Snow Sweeper Rattan and Car Seat Webbing are maintained, ready for immediate shipment from points listed below.

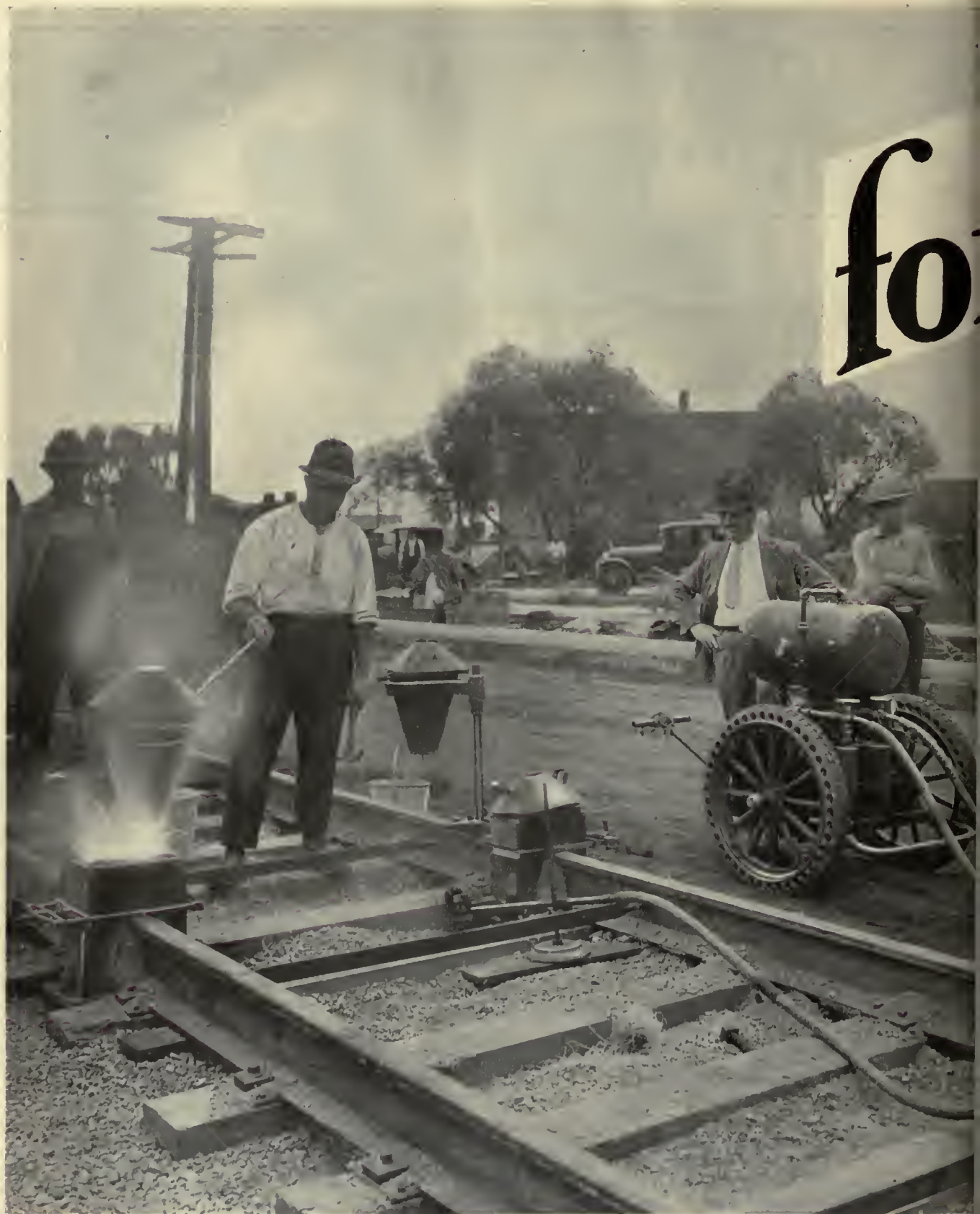
Heywood-Wakefield

REG. U.S. PAT. OFF.

HEYWOOD-WAKEFIELD SALES OFFICES

HEYWOOD-WAKEFIELD COMPANY
516 West 34th St., New York, N. Y.
HERBERT G. COOK
Hobart Bldg., San Francisco, Cal.
THE G. F. COTTER SUPPLY CO.
Houston, Texas

HEYWOOD-WAKEFIELD COMPANY
1359 Railway Exchange Bldg., Chicago, Ill.
F. N. GRIGG
630 Louisiana Ave., Washington, D. C.
THE RAILWAY & POWER ENGINEERING CORP.
Montreal, Toronto and Winnipeg, Canada



METAL & THERMIT

PITTSBURGH

CHICAGO

BOSTON

120 BROADWAY,

a smooth quiet ride—

the starting point is jointless track

THERMIT-WELDED

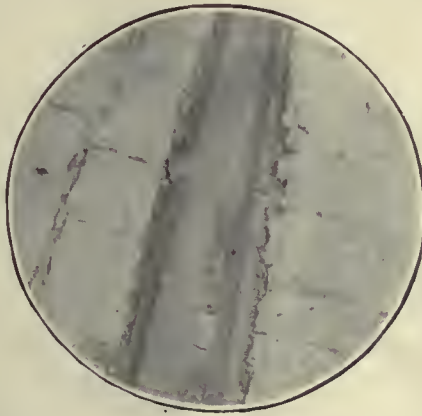
The finest street car ever built cannot roll smoothly on a rough track. The most modern noise-reducing ideas in car design will fail where broken or cupped track joints exist.

There is only one established time-tried way to overcome the bad joint troubles in track. That way is to eliminate the joints.

Thermit-welding makes solid rail, one smooth unbroken surface on which the steel wheels

roll. It automatically eliminates cupping. There is no gap for wheels to jump, because where the rail ends meet they are solidly and permanently united! The life of the track is thereafter limited only by the wearing life of the rail itself.

Your modern cars will travel more quietly, and require less maintenance themselves on Thermit-welded track.



**NO PLATES
NO BONDS
NO BOLTS**

It's easier and cheaper than ever to do. Ask for our proposal on your 1926 track program.



CORPORATION

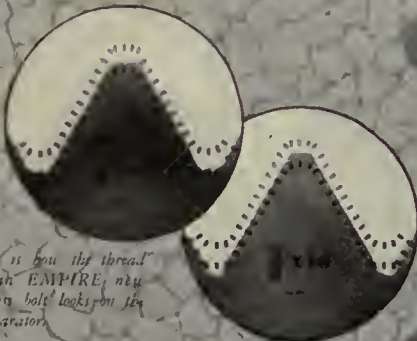
NEW YORK, N.Y.

SOUTH SAN FRANCISCO

TORONTO

EMPIRE *New Process* BOLTS

THE only difference between an Empire *New Process* bolt and a hardened and ground gauge is that the bolt is made in a few seconds, and the gauge in a number of hours. There is no difference in fit.



This is how the thread of an EMPIRE, new Process bolt looks on the comparator.

This is how the thread of a hardened and ground gauge looks on the comparator.

RUSSELL, BURDSALL & WARD
BOLT & NUT COMPANY
 PORT CHESTER, N.Y.



Branch Office:
Sears Building
CHICAGO

Branch Office:
General Motors Bldg.
DETROIT

Branch
Factory
ROCK FALLS, ILL.

Sterling & Gillette
179 Jackson Street
SEATTLE

Maydwell & Hartwell, Inc.
148-148 Eleventh Street
SAN FRANCISCO



Makers of Bolts, Nuts and Rivets Since 1845

Bates Installations in 1926



AS IN 1925, '24, '23, and so on back through a period of many years, this year will see Bates installations made by numerous companies as a natural part of their economic construction program.

THAT—

BATES INSTALLATIONS ARE GIVING *highly satisfactory* service in practically every country of the world, is evidenced by the fact that in a single year Bates installations were made in 40 of the 48 States of the United States and in 31 foreign countries, and the reports received indicate that these installations are satisfactorily meeting these varied requirements.

Why This General Acceptance

This wide general acceptance of Bates Products, by so many leading companies all over the world, speaks well of the service which is being given to this branch of the electrical industry. This service merits your consideration of Bates Products when you are planning installations of poles, towers or substations.

The Bates Organization which has been an aid to others in solving their installation problems, is ready to cooperate with you.

We take this opportunity to wish the Electric Railway Industry great progress through 1926 and the coming years.

AN ORGANIZATION specializing on the supporting structure requirements of the electrical industries, having complete facilities for designing, detailing, fabricating and painting or galvanizing its products, all within one company.

Specify Bates

POLES
TOWERS
SUBSTATIONS

B E S T
Bates Expanded Steel Truss Co.

General Offices and Plants
EAST CHICAGO, INDIANA, U. S. A.

New York Office

51 EAST FORTY-SECOND ST., NEW YORK, N. Y.



Electric Railway Track Costs Are Reduced with Creosoted Ties

"You can cut your average tie cost 30% per year through the use of a properly treated tie"

said the superintendent of a well known street railway in an address delivered before the Mid-West Electric Railway Association in a convention at Kansas City.

Sound, creosoted ties are excellent insurance against decay. Their long life assures low annual cost, fewer tie renewals and fewer track disturbances.

The following are advantages of creosoted ties which have a direct bearing on improving service and reducing operating expenses.

Longer Life — Durability — Easy to Maintain
Low Annual Cost — Resilient — Noiseless

Your requirements can be shipped immediately from A.R.E.A. standard specification stock on hand. Order now for Spring delivery.

International Creosoting & Construction Co.

General Offices—Galveston, Texas

Plants: Texarkana, Texas Beaumont, Texas Galveston, Texas

Port Arthur Traction Co. International Creosoted Pine Ties installed in 1909 in street car service in the city of Port Arthur, Texas.

International

HIGH GRADE CREOSOTED TIES

Are Ready for You Now!





SAMSON SPOT TROLLEY CORD

Long experience has demonstrated the superior durability of this better trolley cord, its resistance to weather, due to thorough waterproofing, and its freedom from any tendency to kink or jam the retrievers. You will find it always smoothly braided and free running.

SAMSON SIGNAL CORD

Of the same high quality. Is supplied in drab and mahogany colors. The mahogany cord is also furnished with a wire centre, if so required.

Send for samples.

SAMSON CORDAGE WORKS

Boston, Mass.



Lib

**MORE-JONES
'TIGER' BRONZE
AXLE and
ARMATURE
BEARINGS**



**"Tiger" Bronze Axle
and Armature
Bearings**

Possess in greatest degree the essential physical properties of strength, resistance to heat and a low rate of wear. They insure maximum service under the hardest operating conditions.

**M-J Armature
Babbitt**

Scientifically compounded for the railway field exclusively. It is pure tin, copper, antimony and metallic nickel, alloyed to the highest degree of practical utility — not a trace of lead in it, the merit of which is proved by its widespread use here and abroad. There is nothing better for long, efficient and most economical results.

**M-J No. 10 six inch
Lubricating Trolley
Wheel equipped in our
No. 6 Harp.**

Designed for high speed city and interurban trolley service, eliminating a very high percentage of former maintenance requirements. The wheel is made of only pure new metal, scientifically designed and constructed to give a high and uniform average mileage without undue wear on the overhead. Easy to remove and replace. Current capacity greatly improved. Detailed information and prices upon request.

**MORE-JONES
ARMATURE
BABBITT METAL**

**MORE-JONES B & M CO'S
ST. LOUIS, MO.**

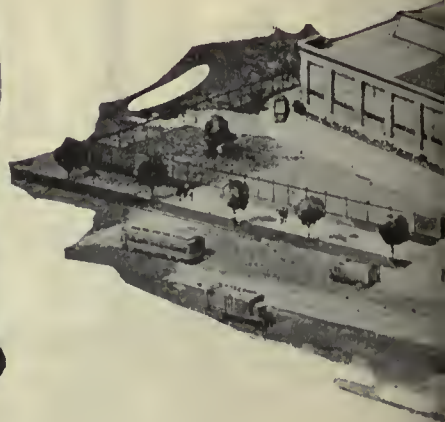
ARMATURE



**MORE-
JONES
TROLLEY
WHEELS
AND
HARPS**



**MORE-JONES
QUALITY PRODUCTS**

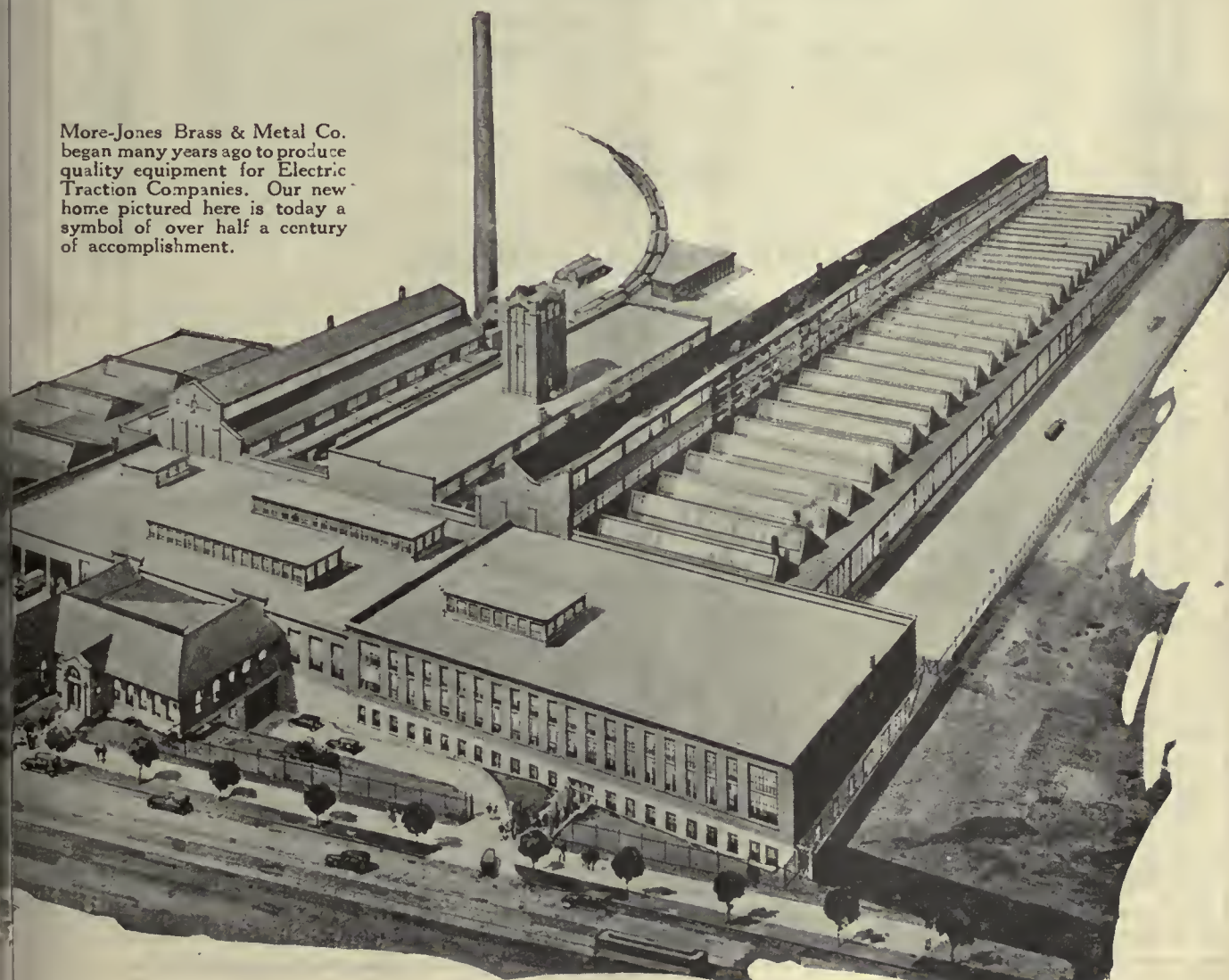


eral Mileage per dollar invested

The facts concerning More-Jones electric railway equipment (Trolley wheels — Haiss "Tiger" Bronze Axle and Armature Bearings — M-J Armature Babbitt), are that they offer decided advantages from a service and maintenance standpoint. Figures computed over a certain period of usage of this equipment, will prove these facts. That you can obtain liberal mileage per dollar invested from these maintenance items on your trolley cars is a certainty. Let us help you solve your equipment problems. Get our prices.

More-Jones Brass and Metal Co.
St. Louis, Mo.

More-Jones Brass & Metal Co. began many years ago to produce quality equipment for Electric Traction Companies. Our new home pictured here is today a symbol of over half a century of accomplishment.



A Message to the Electrical Industry

BACK of the words "Rome Wire Company" there stands an organization. One division of this organization is a department composed of engineers and chemists whose primary job is the development and improvement of Copper Wires and Cables for electrical purposes.

The information which this department has accumulated, the combined knowledge of all these men, is at the disposal of any organization using Copper Wires or Cables.



ROME WIRE COMPANY

Mills and Executive Offices, ROME, N.Y.
Diamond Branch, BUFFALO, N.Y.

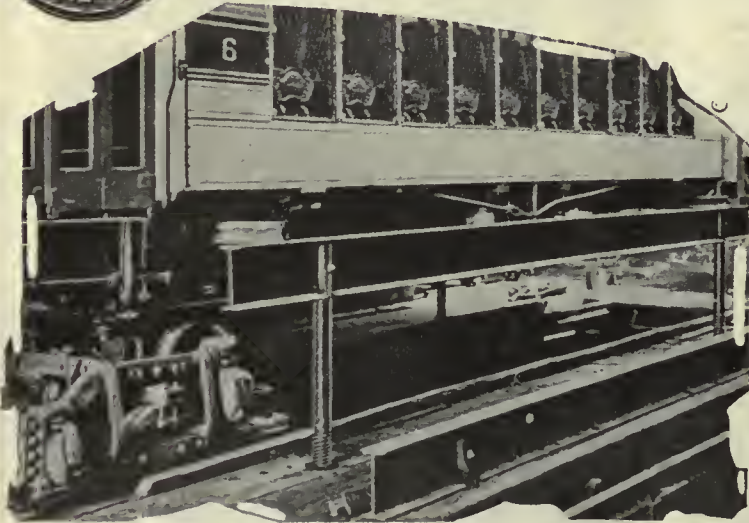
New York	Boston	
50 Church Street	Little Building	
Chicago	Detroit	Cleveland
14 E. Jackson Blvd.	25 Parsons Street	1200 W. 9th Street
Los Angeles	San Francisco	
J. G. Pomeroy, Inc.	J. G. Pomeroy, Inc.	
336 Azusa Street	51 Federal Street	



Topping the peak for over fifty years **SILVER LAKE TROLLEY CORD**

has consistently rendered super-service because of its tough, strong, waterproof and long-lasting qualities. Bell and register cords made in all sizes and colors. Ask for samples.

Silver Lake Company, Newtonville, Mass.



Columbia

Electric Car Hoists and Bus Hoists

When it is necessary to repair and inspect railway cars or buses, raise them on Columbia Hoists. Then the men can work underneath with ample freedom and plenty of light and air. At the same time other men can work around the upper part of the bus by standing on the platforms hinged to the channels on both sides.

The Car Hoist raises a 50-ton car 6 feet in less than 5 minutes. The Bus Hoist lifts at the rate of about $2\frac{1}{2}$ feet per minute to a maximum height of 5 feet.

Columbia Electric Car Hoists and Bus Hoists are money-savers in any shop.

Ask for further particulars.



The

Patent Applied For

*Columbia Hoist in the Connecticut
Company's Shops at New Haven.*

COLUMBIA MA

and Malleable Iron Company,

Products

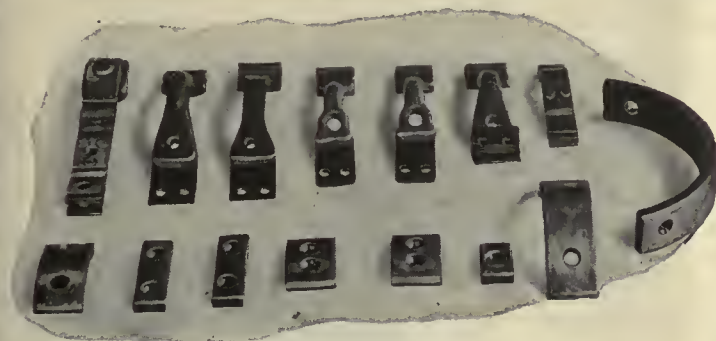
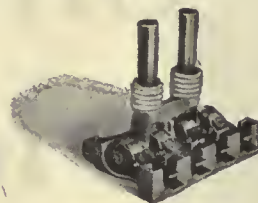
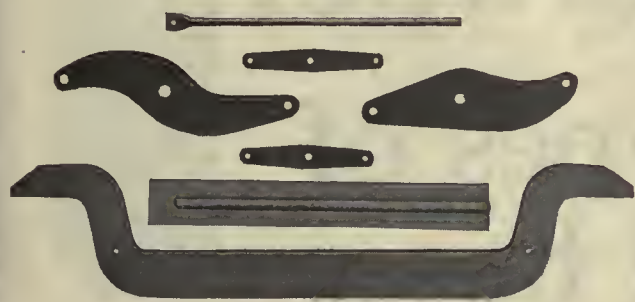
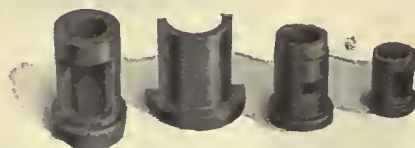
Electric Railway Supplies

With a new and larger plant equipped with modern machinery, and thousands of patterns, jigs and fixtures, Columbia Shops are prepared to render better service than ever before to the industry. Thirty years' experience is behind this organization.

Prices and specifications on request, for any of the following Columbia Specialties:—

Trolley Wheels, Poles and Harps
Armature and Axle Bearings
Railway Motor Parts
Controller Parts
Gear Cases (Steel and Malleable Iron)
Terminals of All Types

Armature and Field Coils
Commutators (All Types)
Signal or Target Switches
Brush Holders
Resistance Grids
Line Material
Forgings and Castings, etc.



ACHINE WORKS

estnut Street—Atlantic Avenue Brooklyn, N.Y.

ROOT

Life Guards and Snow Scrapers

for all types of
cars and buses

Write for specifications and quotations

Root Spring Scraper Co., Kalamazoo, Mich.

25,000 obsolete cars still in service

Contrast them with the modern car
heated and ventilated the Utility way

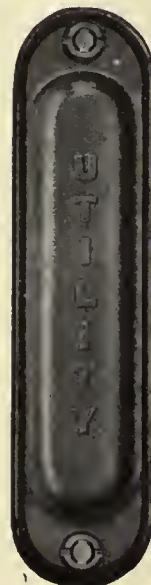


UTILITY
2-Element
Vestibule Heater
No. 106

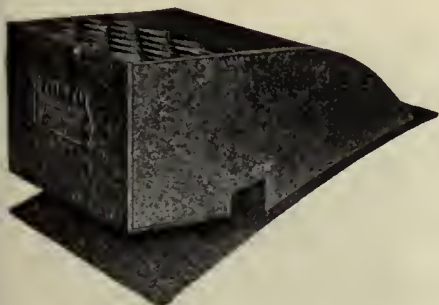
Utility Heaters are built throughout of non-deteriorating materials. Genuine Chromalox elements are the active parts, supported in such a way that no extra guards or shields are required.

And to be modern a car requires the best heating and ventilating system such as supplied by Utility heaters and ventilators. Passenger comfort is daily becoming a more important factor. It's the surest way of beating competition and increasing revenue.

Utility Car Heating and Ventilating Devices are standard equipment for many railway properties, having been proved by hundreds of installations the most effective equipment for conditioning the air in the car.

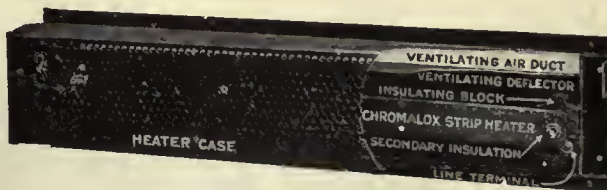


UTILITY
New Type
Heat Regulator
No. 9 no relay.
Greater uniformity of temperature and comfort with 50% saving in current.



UTILITY
Honeycomb
Ventilators

are constructed on the most scientific principle. Not only is the ventilation superior with this type of equipment, but a great saving in current for heating is also effected.



Truss Plank Heater
Showing strip element in place and Air Duct.

RAILWAY UTILITY CO.

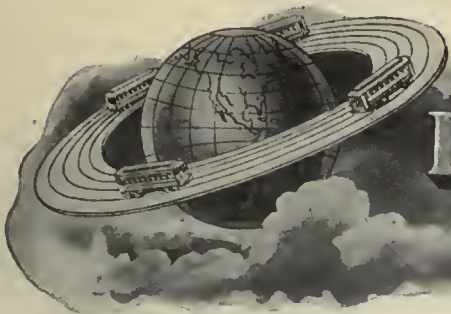
141 to 151 W. 22nd St., Chicago, Ill.



*A*nother year ~ another
page in the book of time ~
another opportunity to
make new friends ~

another bond to cement
the old friendships which
have stood fast through
the years

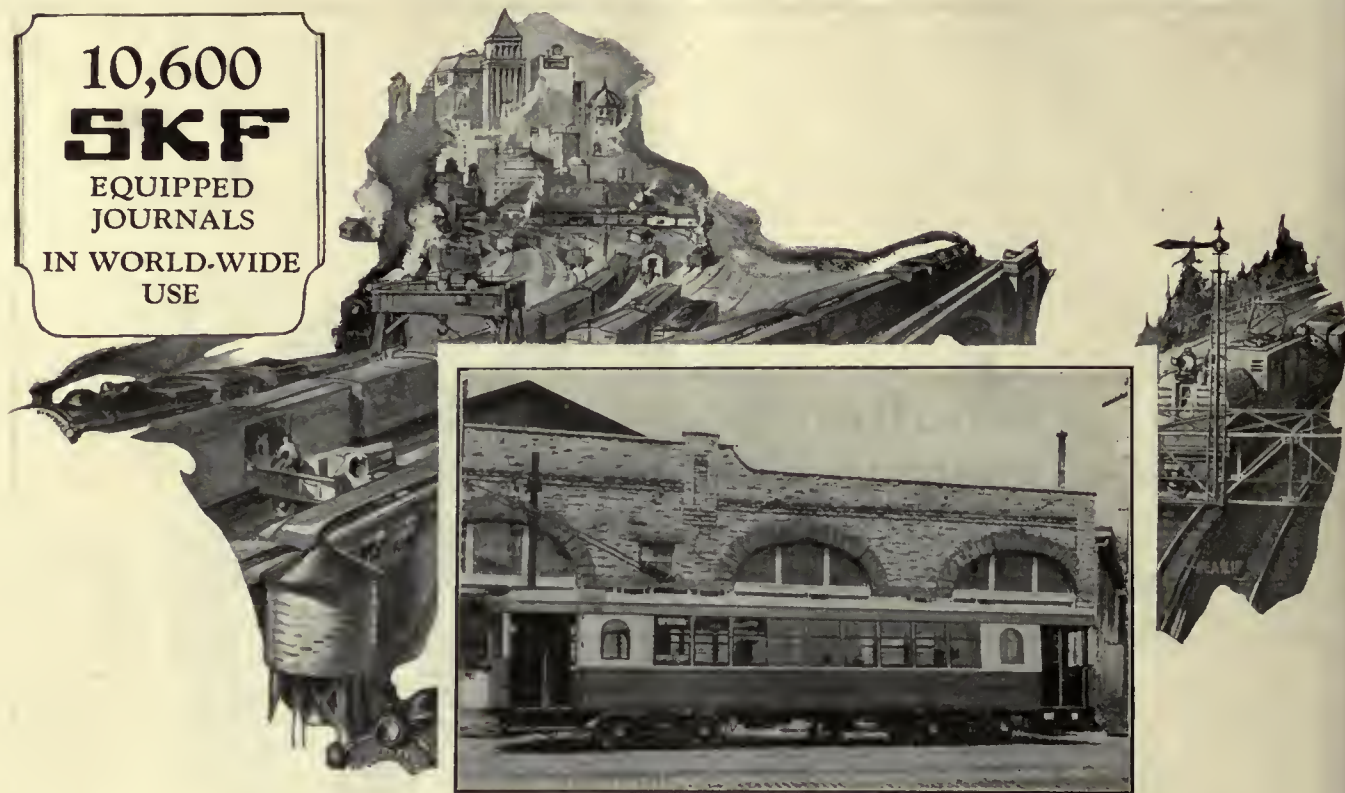
In the years which have
passed it has been our
privilege to create and
establish car card space
values. We look forward
confidently to the work
and pleasure we will
find in maintaining them
in the years which are
to come



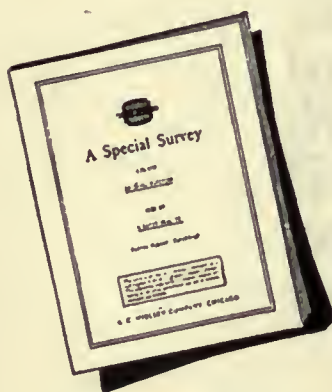
Barron G. Collier

INCORPORATED

10,600
SKF
EQUIPPED
JOURNALS
IN WORLD-WIDE
USE



Keep Cars on the Road — Improve Service with **SKF** Equipped Journals



Special Certified Survey
Sent on Request

PROFITABLE operation of street railway systems involves the modernizing of car equipment. An essential part of any such program calls for anti-friction bearing journals and motors which reduce maintenance costs and improve service.

SKF marked self-aligning roller bearings are finding wide favor in the electric railway field because they are rugged, dependable and do not require constant attention to keep rolling stock moving.

SKF INDUSTRIES, INCORPORATED
165 Broadway, New York City

1519

More than 100 Factory Offices Throughout the World

SKF
Puts the
Right Bearing
in the
Right Place

Ball Bearings **Roller Bearings**

1926

1926

Start the New Year Right!!

Equip your cars with

H-B LIFE GUARDS

The most universally used life guards on street railways
all over the world

**H-B Life Guards are used on the most modern
and up-to-date Safety Cars**

They are

Efficient Reliable Economical

If your cars are equipped with H-B Life Guards give them a thorough overhauling and make sure they are in proper condition to do the work they are designed to do—**PREVENT FATAL ACCIDENTS AND INJURY TO LIFE AND LIMB.**

See that they are properly adjusted—**WRITE FOR OUR INSTRUCTION SHEET** on the proper method of installing H-B Life Guards.

In writing specifications for new cars be sure to

Specify

H-B Life Guards *Manufactured by*

The Consolidated Car Fender Company

This will insure your getting a guard substantially and properly built; backed by years of experience in specializing on these equipments.

**DO NOT ACCEPT A SUBSTITUTE
INSIST UPON H-B LIFE GUARDS**

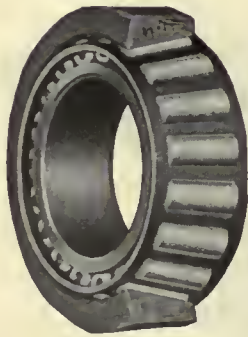
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The Consolidated Car Fender Company, Providence, R. I.

WENDELL & MacDUFFIE CO., General Sales Agents

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You know that your original equipment for power would have cost less based on the far lighter starting and running loads of Timken-equipped line shafting, highly-friction free.

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You know that depreciation would have been carried for less all these years, with misalignment, repairs and shutdowns guarded against by greater Timken Bearing capacity, for both radial and thrust loads.

You could go to a Timken-equipped basis right now, and have the whole cost come back in lubrication savings alone.

Have you figured that the endurance factor in Timken design and in Timken-made bearing steel leaves by far the biggest part of all possible savings still to be made? Write for data.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

Technical information regarding bearing sizes and their mountings can be secured from the Timken Roller Bearing Service & Sales Company's Branches located in the following cities: Atlanta, Baltimore, Boston, Buffalo, Chicago, Cleveland, Dallas, Denver, Detroit, Indianapolis, Kansas City, Los Angeles, Memphis, Milwaukee, Minneapolis, Newark, New York, Omaha, Philadelphia, Pittsburgh, Portland, Richmond, St. Louis, Salt Lake City, San Francisco, Seattle, Toronto, Winnipeg.

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Damages paid for one car-step accident may cost you more than a complete "Safkar" equipment for every car on your system. Write for Catalog 4A28.

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IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y. U.S.A.

DIFFERENTIAL STATISTICS



Differential Cars (*side dump*)

56 Companies using Differentials.

260 Differentials in service.

11 year old Differentials still giving good service.

1½ cents per ton mile for placing material on the job with Differentials.

1 year. Average length of time required for actual savings made by Differentials to equal their cost.

The Differential Steel Car Company

has been devoting its entire energy and resources for 11 years to developing work car equipment for electric railways. The development of this equipment has been a result of faith in the railways' future.

THE DIFFERENTIAL ELECTRIC LOCOMOTIVE CRANE CAR

Designed and Constructed for Electric Railways

In the past few months 4 of the leading traction companies have purchased 8 of these crane cars. This new electric railway development should have a great appeal to all railway operators.

Send for Bulletin D-16

THE DIFFERENTIAL CAR WHEEL TRUCK AND TRACTOR

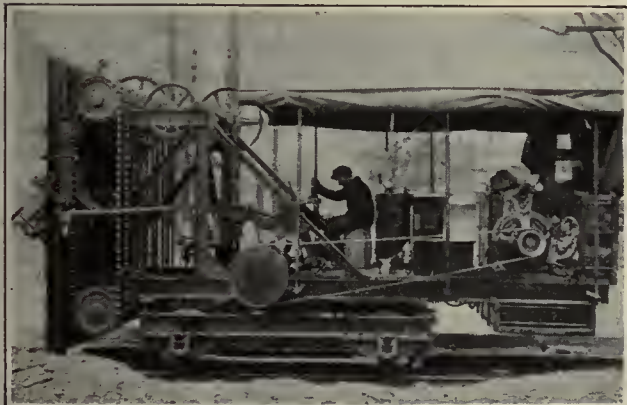
10 of these devices are being used on 6 railway properties for mounting Electric Shovels. This dual traction truck, allowing machine to travel on rails or on ground, increases shovel capacity 75% and cuts labor force in half.

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THE DIFFERENTIAL BOTTOM DUMP CAR

is being used with great saving wherever open track is to be ballasted.

THE DIFFERENTIAL STEEL CAR CO. FINDLAY, OHIO



CLARK CONCRETE BREAKER

Used by many of the leading traction companies. Breaks concrete for less than 2c per track ft.



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—for over 20 years
the standard spring
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Leading electric railway operators throughout the country have learned to rely on Fort Pitt Springs. They appreciate the unfailing service which these springs have given not only on electric railway, but also on steam railway locomotives, freight and passenger cars.

Prompt shipments made on either standard or special types. Ask for quotations on your requirements.

Full Elliptics for Car Trucks.

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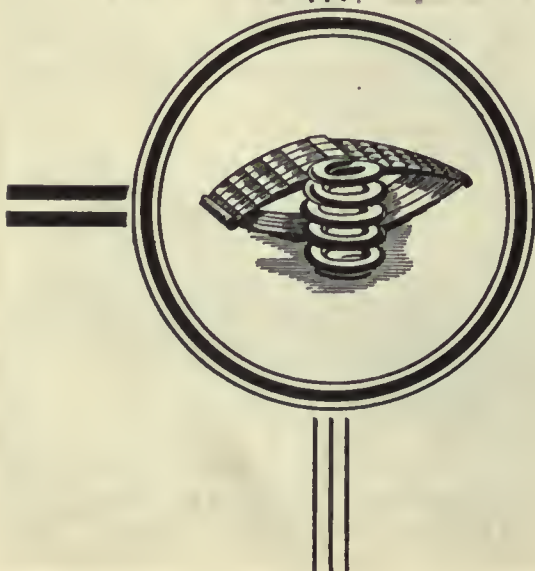
Special Types of Quarter, Half and Three-quarter Elliptics for Electric Railway Service.

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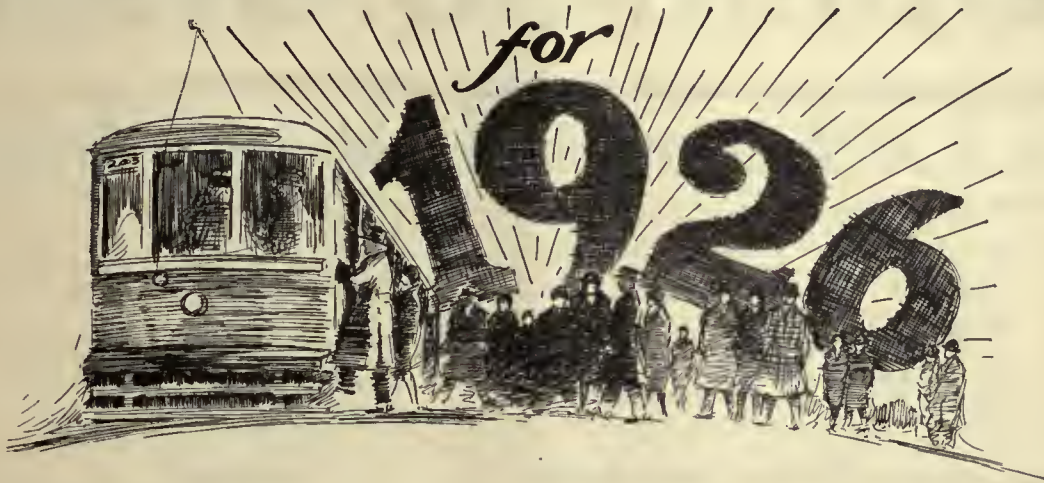
Extension Springs.

Copies of abridged catalog and specification book sent on request.



Fort Pitt Spring & Mfg. Co.
Pittsburgh, Pa.

All aboard and *more* aboard



Two good New Year better business tips

(1)

Nuttall

Standard BP Helical Gears

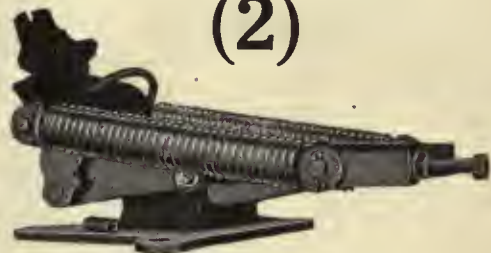
People who use other means of transportation than your street cars do so for two reasons—convenience and comfort. Make your cars more comfortable, easier riding, convenient in design, and they'll not lack for increased patronage.

You can take a big step in the right direction without disorganizing present service and without re-financing—by equipping with Nuttall Helical Gears. They will eliminate all the racking noises and vibration of spur gearing—for Nuttall Helicals mesh like the turning of a screw.

Furthermore the BP Heat Treatment of Nuttall Helicals in itself guarantees at least three times greater gear life, quite apart from savings in maintenance effected through elimination of vibration, and the gears cost you about 70% less in the long run than untreated gears.



(2)



The new

Nuttall Form US 20A

Timken Roller Bearing Trolley Base

A really *new* trolley base, simplified and engineered to the same high standards of efficiency and low maintenance as the modern car motor. Incorporates the famous Timken Roller Bearing—a tapered double-race roller bearing designed by this manufacturer especially for trolley base service.

Profitably interesting features include extreme sensitiveness, with swiveling strains evenly distributed on bearings; oil and grease reservoirs for lubrication of bearings and pole socket axle pin respectively; quick, easy lubrication only once in six months.

Full specifications on request.

R.D. NUTTALL COMPANY
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All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

Nuttall

MODERN CARS for

J. N. Shannahan said—

"I would relegate to the scrap pile the old, heavy and obsolete cars, replacing them with new, brighter and lighter cars, in most instances with one-man cars."

Quoted from paper by J. N. Shannahan published in Electric Railway Journal, September 26, 1925. Mr. Shannahan was at that time President of the American Electric Railway Association.

The Birthplace of the Safety Car

St. Louis Car Company

INTERURBAN AND CITY PASSENGER CARS AND TRUCKS
SELF PROPELLED RAILCARS - BUSES
STEAM RAILROAD COACHES AND FREIGHT CARS
SEATS, CURTAINS, TRIMMING AND GENERAL RAILWAY SUPPLIES
BRONZE, BRASS, GRAY IRON AND MALLEABLE CASTINGS
STEEL FORGINGS

Cable Address
"Car"

St. Louis, Mo., January 1st, 1926

EDWIN B. MESSNER
PRESIDENT & GENERAL MANAGER

TO THE ELECTRIC RAILWAY INDUSTRY:-

Notice please, in the accompanying quotation, that Mr Shannahan in speaking of replacing the obsolete cars, states definitely that he would replace them with other CARS - new cars, - brighter cars, - lighter cars!

The experience of numerous railway companies which have done this has invariably been successful where the choice of type of car has been wisely made, and where passenger-attracting features have been included.

It is the pleasure as well as the business duty of the St. Louis Car Company to offer its extensive resources to the railways. We can assist them in gathering actual experience data from other railway properties. We can aid them in studying conditions and selecting the most appropriate type of car to do the job. We can furnish concrete suggestions for making cars which will appeal to the riding public and thus increase revenues. We can construct cars which will reduce materially burdensome operating and maintenance costs.

Our services at your disposal. Call upon us.

Yours very truly,
Edwin B. Messner
President & General Manager.

EBM/D

*This is the first of
of advertisements devoted
Modern Cars.*

Modern Conditions— Grand Rapids Railway Co. Leads!

After careful investigation, and thorough service tests, extending over a period of many months, with experimental sample cars, the Hodenpyl-Hardy Interests, keenly alive to the trend of the times and the wishes of the riding public—have as a concrete example of their convictions placed a substantial order for new, attractive, modern cars, not only economical in operation and maintenance, but appealing and pleasing to the public.

The Quality Car Wins



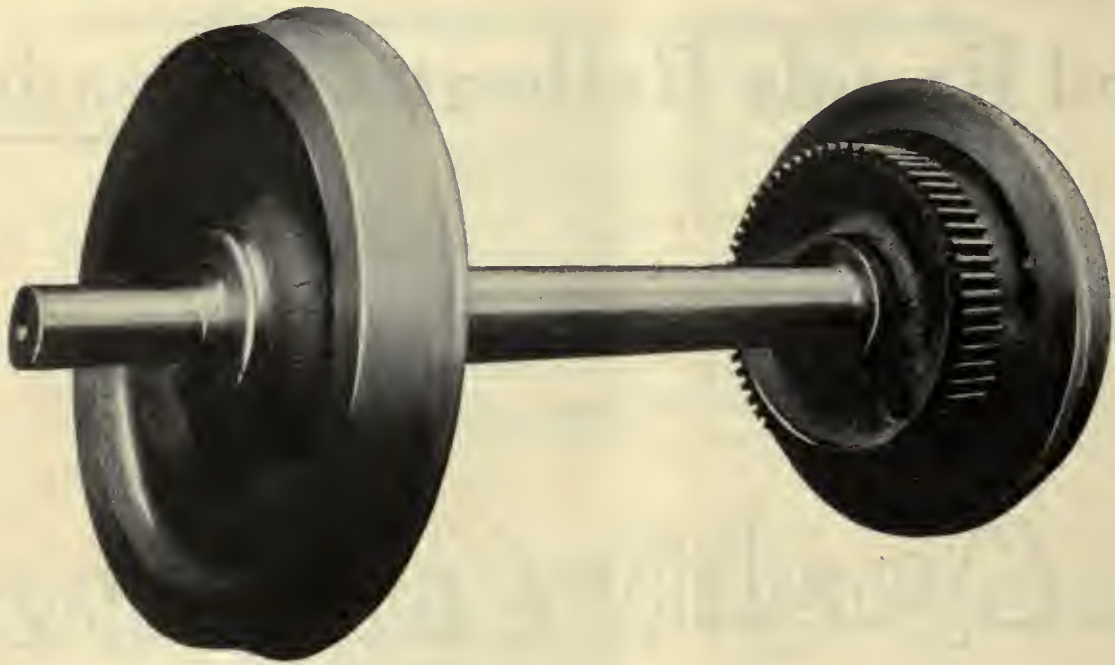
**Order for 27 Cars Placed
by Grand Rapids Railway Co.
Grand Rapids, Mich.**

with

**St. Louis Car Company
St. Louis, Mo.**

"The Birthplace of the Safety Car"





WHEELS and AXLES

The choice of representative railroads, which have taken steps to procure the latest and best in rolling stock—STANDARD STEEL Wheels and Axles are found on the majority of finest railway cars. Light-weight city and interurban equipment as well as the heaviest electric traction services are included in the list of transportation companies specifying "STANDARD STEEL" for their modern cars.

STANDARD STEEL

WORKS COMPANY

PHILADELPHIA, PA.

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WORKS: BURNHAM, PA.

For modern cars

*Rolled Steel Wheels
Quenched and
Tempered Carbon
Steel Axles
Coil and Elliptic
Springs*



Not statistics—just a little



Just what we mean by “Boyerized”

Boyerizing is a special hardening process which gives steel parts a glossy glass-hard armor coating that literally offers no “foothold” to wear. Under the grinding strain of brake and truck service on electric railway cars, Boyerizing becomes practically essential, not only from the viewpoint of costs, but because of the extra measure of safety it assures.



The MacArthur Turnbuckle

Instead of a big coarse-threaded jam nut that needs a two-fisted wrench for application you require only a pocket-size wrench that is applied at a convenient angle. The secret? The jam-nut idea is replaced by a split clamp with a spring power that won't be loosened once the little nut on the side has been tightened.

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W. F. McKenney, 54 First Street, Portland, Oregon.
J. H. Denton, 1328 Broadway, New York City, N. Y.
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'plain figurin''



PERFORMANCE data on BOYERIZED Parts resolves itself into a mighty simple formula. In a nutshell, BOYERIZING gives these parts a life equal to *three or four* times that of ordinary steel. Yet the cost of BOYERIZED Parts is not even twice that of ordinary steel parts.

You don't need statistics to prove so obvious a saving,—just a little "plain figurin'" will do. And you'll find ample proof of the authenticity of our claims in the records of any BOYERIZED railway. Better still, be your own judge—

BOYERIZE

one or more cars for a test.

Here's the list to choose from

Brake Pins	Spring Post Bushings
Brake Hangers	Spring Posts
Brake Levers	Bolster and Transom Chafing
Pedestal Gibs	Plates
Brake Fulcrums	MacArthur Turnbuckles
Center Bearings	Manganese Brake Heads
Side Bearings	Manganese Truck Parts
Bushings	Bronze Bearings.

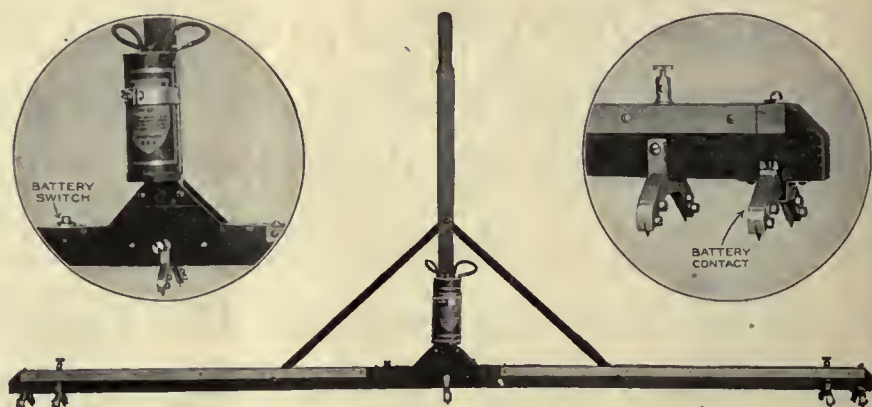


Bemis Car Truck Company

Electric Railway Supplies
Springfield, Mass.

The most IMPORTANT development in the BOND TESTING LINE in years

New ROLLER-SMITH Type BBT BOND TESTER and CONTACT BAR



The new Type BBT Bond Tester is intended for use where the current in the rail is comparatively feeble or where such current is absent, as on new construction or at the ends of trolley lines where no cars are running beyond the point where tests are being made.

The Type BBT Bond Tester has over *five times* the sensitivity of the most sensitive bond tester heretofore made. *It can be successfully used with the current from a single No. 6 dry cell.* This dry cell and the battery switch and con-

tacts are clearly shown in the illustration above.

The Type BBT Bond Tester itself is illustrated below.

Every man who is *any* way interested in bond testing should know all about this new instrument. If you will fill in and forward the coupon below a copy of new Bulletin No. G-200 will be sent you promptly. Or, better still, get in touch with the R-S office nearest you. There is one in every principal city.

*"Over thirty years experience
is back of ROLLER-SMITH"*

ROLLER-SMITH COMPANY
Electrical Measuring and Protective Apparatus



Main Office

2128 Woolworth Bldg., NEW YORK

Works:

Bethlehem, Penna.

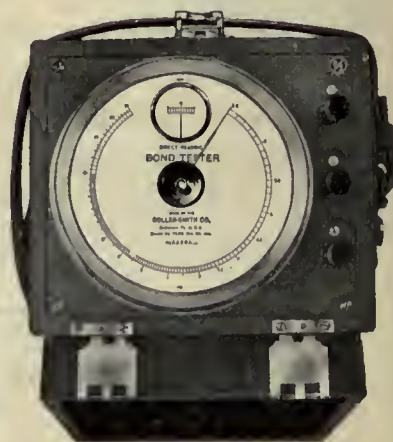
Offices in principal cities in U. S. and Canada, also in Havana, Cuba

Roller-Smith Co., 237 Broadway, New York City, N. Y.

Please send new Bulletin G-200.

Name.....City.....State.....

Company.....Position.....



WHARTON

TRACKWORK

Switches, Mates, Frogs
for severest
traffic conditions



Easton, Pa.
Special Trackwork.
Cylinders for Gases.
Hollow Rollers.



Philadelphia, Pa.
Rolls and Rolling
Mill Machinery.
Forgings.



High Bridge, N. J.
Manganese Steel
Wearing Parts.

Since the very beginning of the electric railway industry Wharton Products have successfully withstood the severest tests of service. Our TISCO manganese steel trackwork for example has time after time proved its exceptional durability.

Included in our designs are those of the American Railway Engineering Association as well as those we originated.

Our more than sixty years' experience is available for those desiring our assistance in designing or selecting standard and special trackwork.

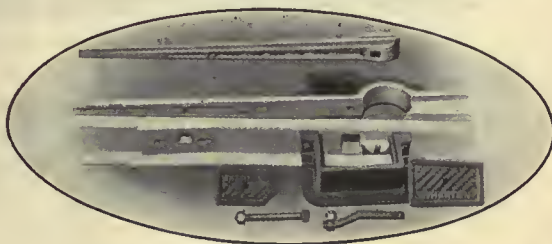
Consult us about your trackwork problems.

Wm. Wharton Jr. & Co., Inc.
Easton, Pa.

Sales Offices:

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El Paso, Tex.
Montreal, Can.
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Philadelphia, Pa.
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Salt Lake City, Utah
San Francisco, Cal.
Scranton, Pa.



...and there on his desk



PHOTOGRAPHED BY PAYNTER

W. Kesley Schoepf, one of the best known traction authorities in the country, who retired from the presidency of The Cincinnati Traction Company when that company was taken over by The Cincinnati Street Railway Company on November 1, 1925. One of Mr. Schoepf's less generally known achievements was his eminently successful personnel relations, fully twenty per cent of The Cincinnati Traction Company's employees at the time of his retirement having individual service records of twenty-five years or more.

was a piece of Elastite!

SHORTLY after the sale of the Cincinnati street railway properties from The Cincinnati Traction Company to The Cincinnati Street Railway Company, which relieved W. Kesley Schoepf, President of The Cincinnati Traction Company, from the responsibilities of operating the street railway lines, an old-time friend dropped into his office to offer congratulations on the success of a dinner given by Mr. Schoepf to officials and employees of the operating companies who had been associated with him as co-workers for the quarter century period covered by Mr. Schoepf's residence in Cincinnati.

Mr. Schoepf's friend was impressed by the fact that for the first time in the thirty-five years of his acquaintance, the retiring executive's desk was clear of business papers. True there were plans for improvements in his country estate at Sheffield Farm, but the only article in sight in any way relating to his traction interests, was a section of rail with the Carey Elastite System of Rail Filler. Mr. Schoepf's friend commented on the presence of this model, which brought from Mr. Schoepf an emphatic explanation.

"I have been trying for over thirty years to find suitable material to fit in next to street car rails to prevent a rapid deterioration of street paving within the track area, not only as an economical proposition, but to bring about an improved appearance of both the tracks and the street pavements.

"About 1915 a representative of The Philip Carey Company brought to the attention of our Engineer of Maintenance of Way a material for this purpose, which he termed an Elastite Rail Filler. Later this matter was brought to my attention. I was so impressed with the possibilities that I decided to experiment with some installations. In the meantime, I also concluded to try creosoted wood filler fitted into position along the rail. This, however, did not give the results anticipated, and since The Philip Carey Company had, by this time, made rapid strides in the matter of production and corresponding reduction in cost, I felt impelled to close a long term contract with that company to use its material in all reconstruction and maintenance of tracks.

"This material is an outstanding improvement in track construction methods and I frankly believe it a radical departure from some of the old methods, and is providing a solution of one of the greatest problems encountered in the maintenance of paving in the track area and in the reduction in noises due to operation of cars."

THE PHILIP CAREY COMPANY Lockland, Cincinnati, Ohio



Carey Elastite System of Track Insulation is an asphaltic compound substantially reinforced with asphalt-saturated felt. It is not affected by moisture or temperature changes and will outlive the track itself. It can be fitted over splice-bars and bolt-heads simply by cutting it with a hatchet, and can easily be fitted to any shape or curve. A tap with a mallet sets the pre-formed strips in place.

Write, today, for complete information.

Carey
Elastite
TRADE MARK REGD. U.S. PATENT OFFICE



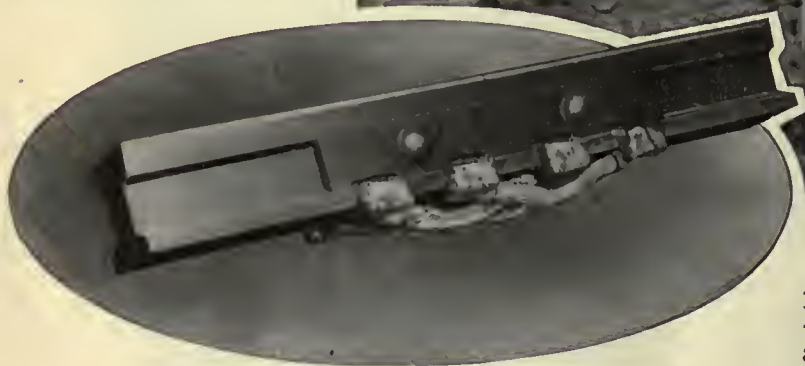
**SYSTEM OF
TRACK INSULATION**

FLAMEWELD RAIL BONDS



Complete bonded joint showing 4—400,000 c. m. type F. C. D. bonds on 150 lb. third rail.

View along right-of-way of the Staten Island Rapid Transit Railway, St. George, Staten Island.



Detail view of type F. C. D. third rail bonds for application by flamewelding. The terminals of these bonds are of dropped forged copper, providing a large contact area for welding, resulting in a low resistance bond.



American Steel & Wire Company Flameweld Bonds and Rubber Covered and Braided feeder and jumper Cables were used throughout on the third rail system of the Staten Island Rapid Transit Railway.

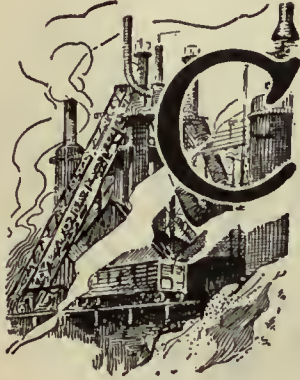
In Flameweld rail bonds is found a valuable combination—ease of installation, low electrical resistance, permanent contact, and ability to withstand continuous service.

Our engineers have at hand a fund of useful experience in solving difficult bond problems. Draw on them for advice or information at any time.

MADE BY

AMERICAN STEEL & WIRE COMPANY

CHICAGO, NEW YORK, BOSTON, BIRMINGHAM. DALLAS, DENVER.
U. S. STEEL PRODUCTS CO.: SAN FRANCISCO, LOS ANGELES, PORTLAND, SEATTLE.



CARNEGIE STEEL COMPANY
extends to you
cordial greetings
for the New Year
with sincere wishes that the year
Nineteen twenty six
will bring you prosperity
and success





DAVIS "ONE WEAR" STEEL WHEELS ARE WORTH MORE—WHY?

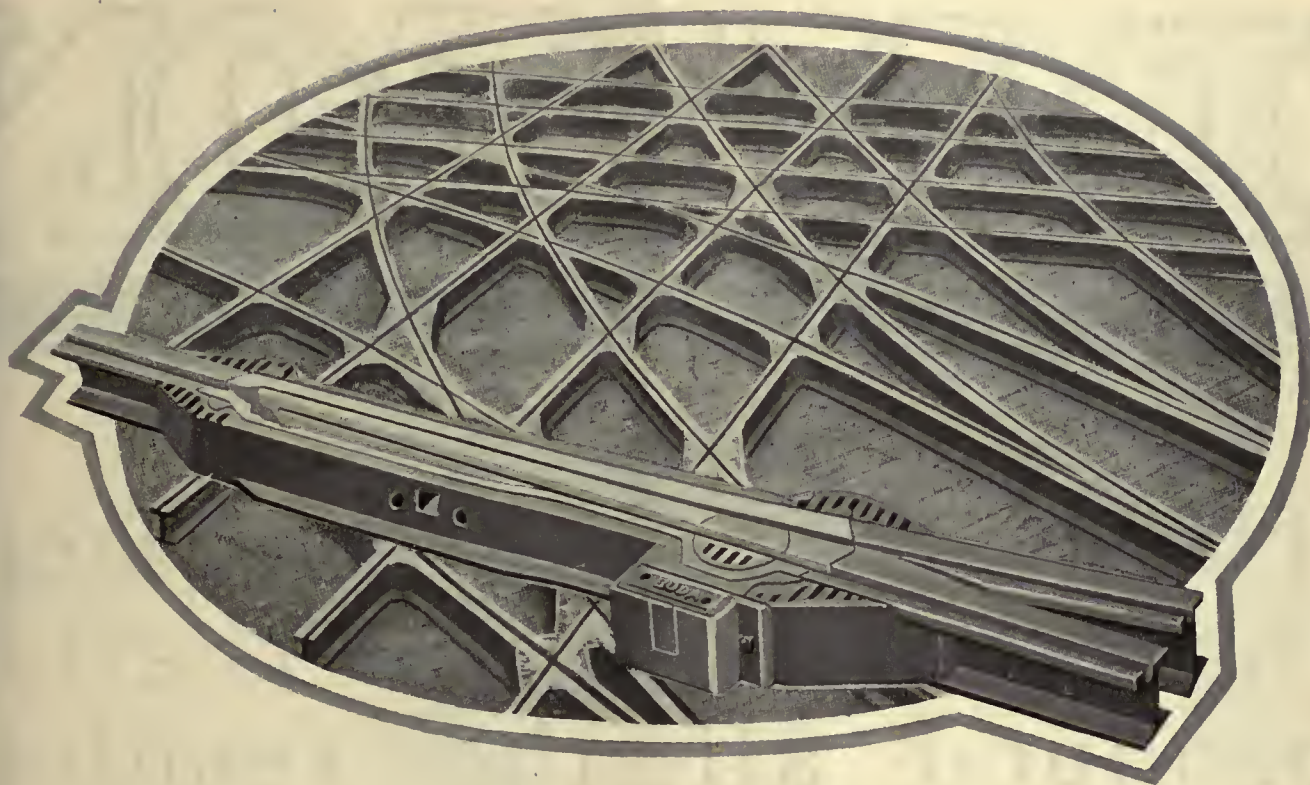
- The wear resisting qualities of special composition heat treated steel insures a big mileage on One Wear.
- They never need contour conditioning.
- They are lighter in weight, which permits heavier revenue loading.
- They keep cars at work instead of in the shop.
- They do away with shimming cars.
- They avoid capital expenditure for wheel conditioning.
- They release men and machinery for other work.
- They reduce journal brass costs by avoiding the scraping of good brasses at wheel turning periods.
- They increase dependability of equipment by reducing "shell-outs," "brake-burns," "chipped flanges" and other wheel failures.
- They are safer and stronger wheels.

DAVIS "ONE WEAR" STEEL WHEELS

have proven that they are worth
more than any other wheel.

AMERICAN STEEL FOUNDRIES
NEW YORK CHICAGO ST. LOUIS

DAVIS WHEELS ARE SAFER WHEELS



Manganese Center Special Track Work

Behind Buda track work and equipment lies forty-four years' experience and the most modern facilities. The name BUDA is an assurance of the highest quality throughout.

Send us your inquiries.

THE BUDA COMPANY
HARVEY (Chicago Suburb), ILL.



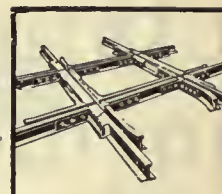
Track and Bonding Drill



Track Jack



Buda Engines



Railroad Crossing



Crossing Gates

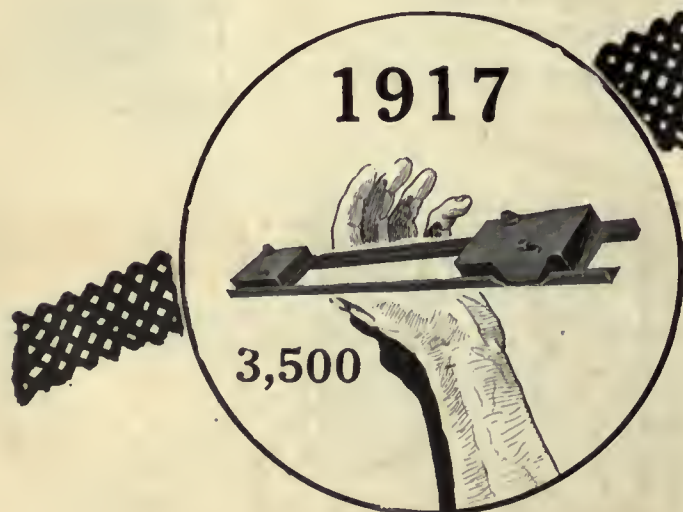


Motor Car



DAYTON

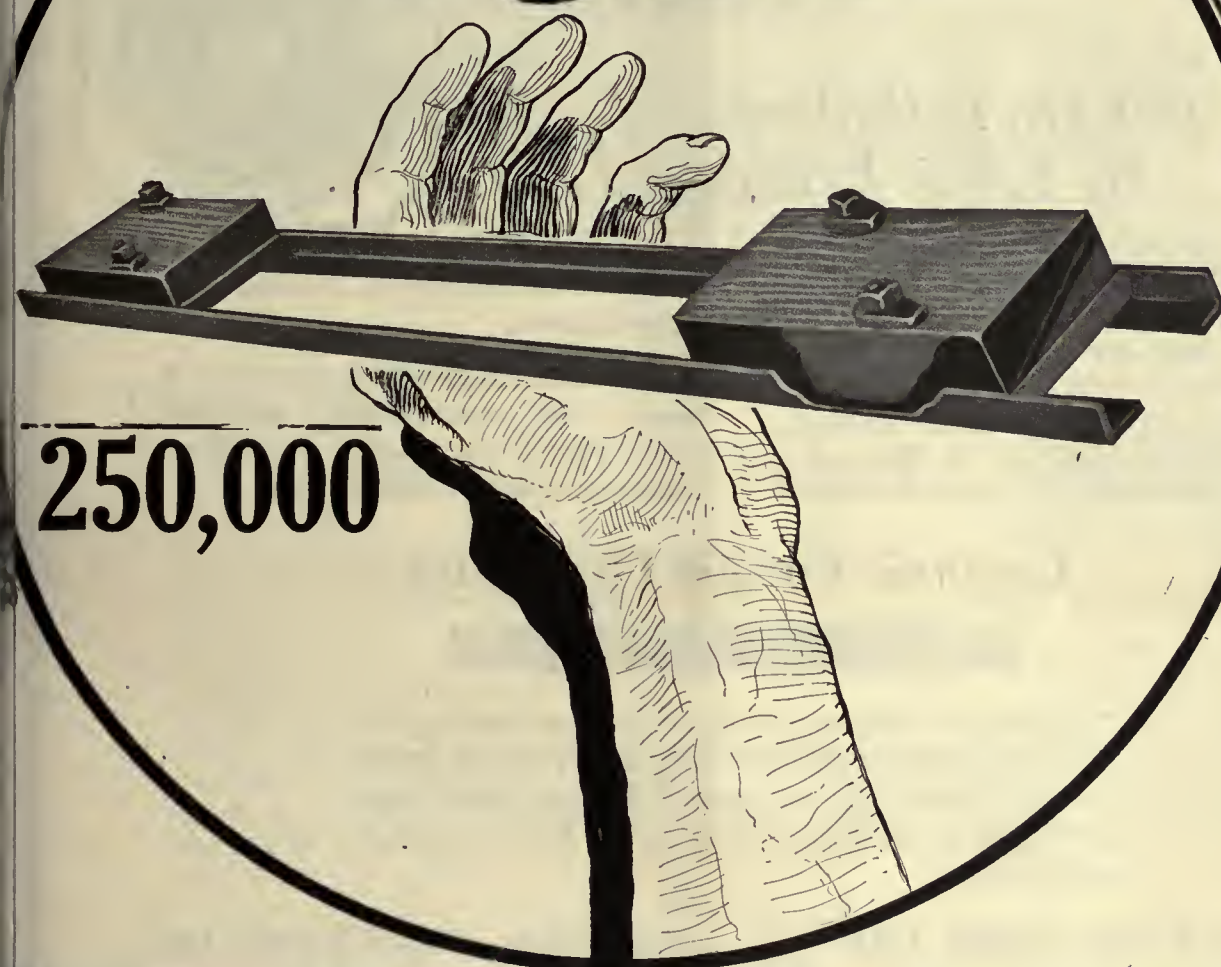
The best proof of the fact that *Dayton Ties* do really produce all the results claimed for them is found in their increased use.



**DAYTON
MECHANICAL TIE**
229 So. Ludlow St., Dayton, O.

**RESILIENT
MECHANICAL**

1925

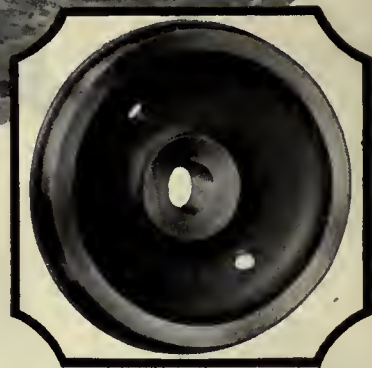


TIES



Birds-Eye View of
Cambria Wheel Plant

Forged *then* Rolled —to Give Longer Life



Cambria Wheels are made by a combined forging and rolling process which gives them great durability and an exceptionally long life.

The forging process gives strength, toughness and density to the metal, while the rolling establishes a grained

structure which prevents breakage and crystallization.

Long experience in the manufacture of wheels and control over materials assure you of a product of the highest quality and finest workmanship.

Cambria Forged Car Axles



Cambria Car Axles are made of the same fine quality as Cambria Wheels and can be furnished smooth forged or rough turned all over; solid or hollow bored; rough turned on journals and wheel seats; heat treated or untreated.

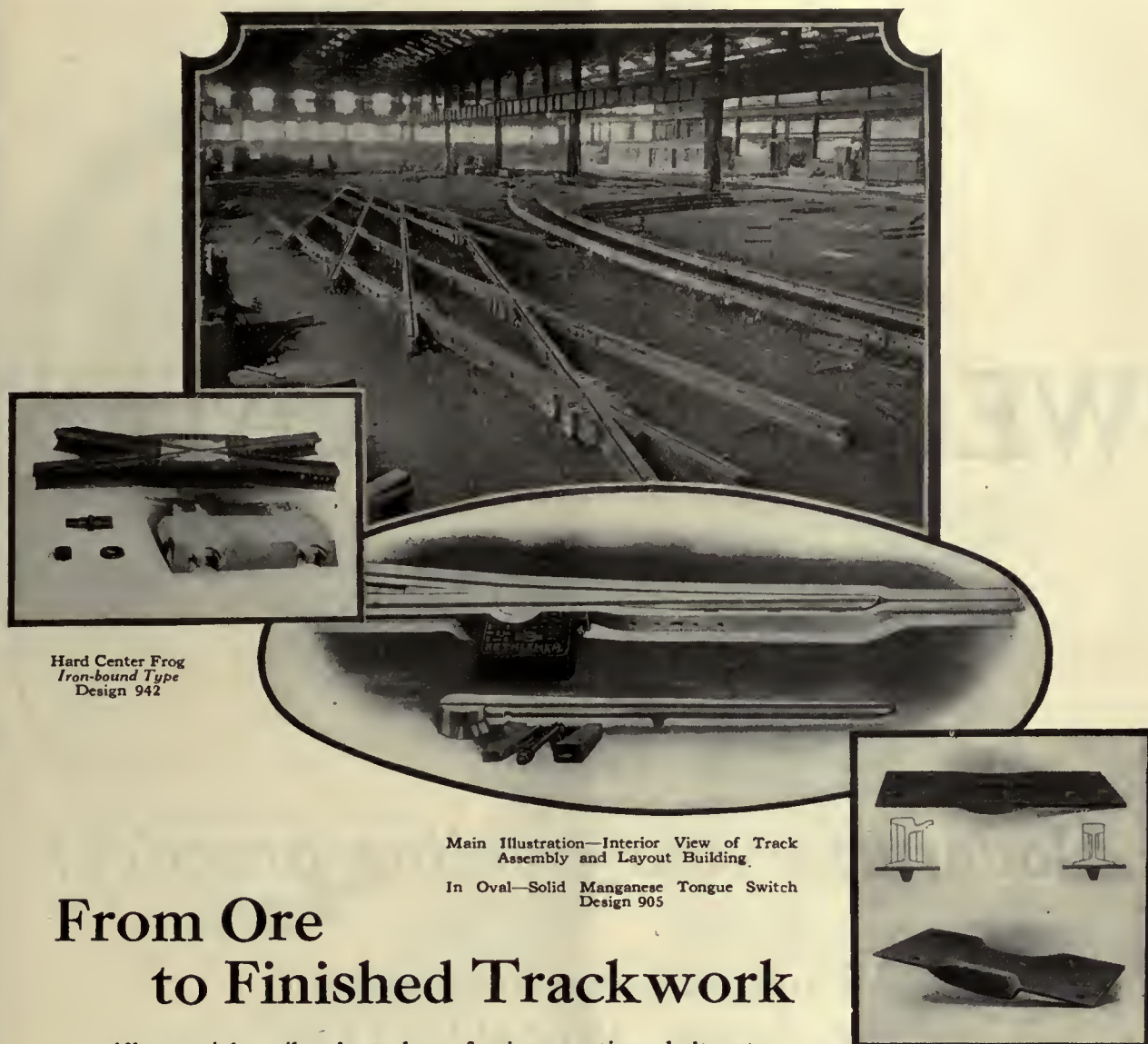
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DISTRICT OFFICES

New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh
Buffalo Cleveland Detroit Cincinnati Chicago St. Louis San Francisco Seattle Los Angeles
Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

BETHLEHEM

CAMBRIA CAR WHEELS AND AXLES



Hard Center Frog
Iron-bound Type
Design 942

Main Illustration—Interior View of Track
Assembly and Layout Building.

In Oval—Solid Manganese Tongue Switch
Design 905

Upper Object—Center Rib Base Plate
Lower Object—Abbott Base Plate

From Ore to Finished Trackwork

All materials, rails, plates, bars, forgings, castings, bolts, etc., are made in Bethlehem Plants—from ore to finished product under Bethlehem constant supervision.

Great care and attention is given to special layouts. Before shipment layouts are assembled to make sure that they will correctly meet conditions in the field.

The fitting up work is done under roof where workmen are shielded from inclement weather, thus enabling them to do accurate work.

Bethlehem manufactures all types of frogs, switches, crossings and special layouts for Electric and Steam Railways; also mine track.

A Few Bethlehem Railway Products

for Electric Railways include Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

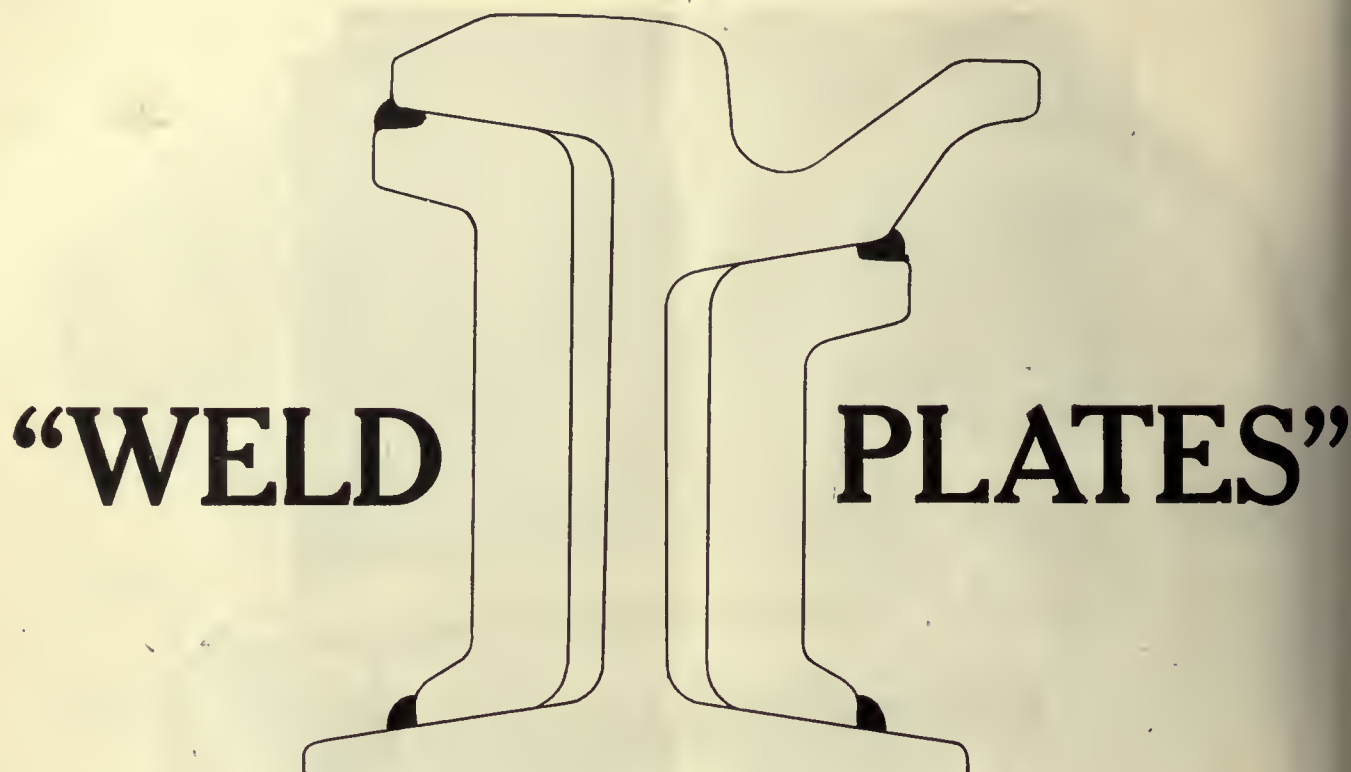
BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

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Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

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SPECIAL TRACKWORK AND LAYOUTS



Modernize your welding practice!

All you need is a trial to show that our patented "WELD PLATES" make the most efficient and economical of bar-weld joints.

Because they are the strongest and most up-to-date plates rolled especially for electric welded joints. Note the shape—the grooves for retaining plenty of weld metal along the upper edges—the wide contact areas at top and bottom,—the suitability for the use of short bolts.

Many of them in successful use.

The Rail Joint Company
61 Broadway, New York, N. Y.



A MATERIAL REDUCTION IN WHEEL DEFECTS

W

HEN equipping cars with Gary Wrought Steel Wheels they not only give multiplied mileage between wheel changes, but put an end to those wheel defects which develop in wheels of softer, less durable or less homogeneous metal.

From the mine to the final product, the process of manufacture is entirely in our hands. This is the secret of the Multiplied Mileage you can count on from Gary Wrought Steel Wheels.



Illinois Steel Company

General Offices

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RELAYING RAILS NEW RAILS

Immediate shipment from
warehouse stock

1 Ton or 1000

All Rails and Track Materials
absolutely guaranteed and ship-
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approval at destination.

**BUY GUARANTEED RELAYING
RAILS AND SAVE**

30% TO 50%

New Rails New Splices—Bolts—Spikes
New Frogs—Switches New Tie Plates—Rail Braces

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PITTSBURGH, PA. — NEW YORK CITY.

CHILLED IRON WHEELS



There is a wheel for every service

Highest co-efficient of Brake Shoe Friction with Minimum Loss of Brake Shoe Metal.

The hard tread becomes polished in service, reducing to a minimum wear between wheel and rail.

The soft hub insures easy machining and perfect axle fit.

**ASSOCIATION OF MANUFACTURERS
OF CHILLED CAR WHEELS**

1847 McCormick Building
CHICAGO

50 PLANTS ~ DAILY CAPACITIES 20000 WHEELS

Partial List of Anderson Material for Electric Railways

Insulated Bolts.
Feeder Plugs.
Boston Suspensions.
Boston Straight Line
Boston Single Curve
Boston Double Curve.
Boston Bracket Arm
Boston Straight Line Twin
Boston Single Curve Twin
Boston Double Curve Twin
Boston Strain Twin
Round Top Straight Line Suspensions
Single Curve
Double Curve
Bracket Arm
Cap and Cone Suspensions
Cap and Cone Straight Line
Cap and Cone Single Curve
Cap and Cone Double Curve
Cap and Cone Barn
Cap and Cone Bracket Arm
Cap and Cone Twin Straight Line
Cap and Cone Twin Single Curve
Cap and Cone Twin Double Curve
Suspension Types A, B, C, E, F, G, H, I, J, K

Insulators
Globe Strain
Elephant Globe Strain
Giant Strain
Wood Strain
Porcelain
Split Spool
Feeder Wire
Section Beam
Double Section Beam

Double Take-Up Turnbuckles
Turnbuckles
Frogs
Any degree
2-4-5 Pull Off Rings
Pivot Type
Removable Ears
Draw Bridge
Wearing Plates

Ears
Double Strain
Half Strain
Feeder
Clamp
Clamp Feeder
Curve Clamp
Double Strain Clamp
Half Strain Clamp
Solder Ears
Feeder Solder Ears
Double Strain Solder Ears
Straight Line Clip Ears
Double Strain Clip Ears
Feeder Clip Ears
Curve Clip
Double Center Straight Line
Mechanical Ears

Strain Plates
Overhead Conductor
Bar Construction
Terminal Clamps
Shackles
Bell Suspensions
Come-along Clamps
Soldering Irons
Trolley Wire Stretchers
Cap and Cone Tongs
Section Switches
Disconnecting Line Switches
Time Switches
Testing Clamps
Lindall Brush Holders
Harps
Sheet Cutters and Wheels All Kinds
Quick Break Switches

Crossings
Any degree
Insulated
Uninsulated
Adjustable
Removable Ears

Yokes
Straight Line
Single Curve
Double Curve

Splicing Sleeves
Tubular Wedge
Splicing Ears
Cable Splicers

Wheels

A long line of ANDERSON Line Material

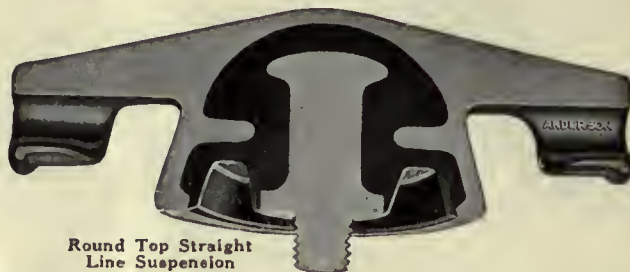
More than thirty years' experience is the basis upon which the long list of Anderson Line Material is designed and manufactured. As conditions progressed in the electric railway field so did Anderson products—so that today they represent the latest ideas in this type of equipment.

Ample stocks of standard line material are kept on hand ready for prompt delivery. Special equipment is designed and manufactured to meet any specific requirements or local conditions.

Whatever your problems may be, our engineering department will gladly cooperate with you.



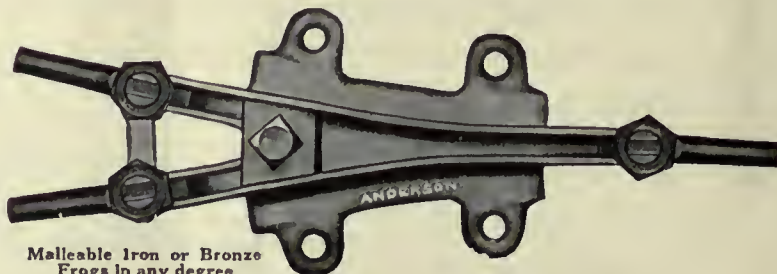
Adjustable Insulated
Crossover.



Round Top Straight
Line Suspension



Giant Strain Insulator



Malleable Iron or Bronze
Frogs in any degree

Look over your stockroom; take an inventory of what you are likely to need during 1926. Take into account also your reconstruction and maintenance plans for the year. Send the list to us and we will gladly give you the latest quotations.

Albert & J. M. Anderson Mfg. Co., 289-305 A St., Boston, Mass.

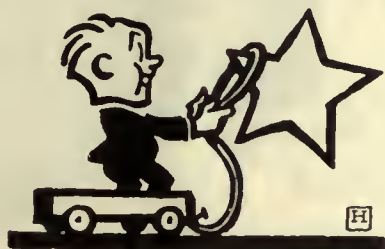
Philadelphia—129 Real Estate Trust Bldg.

New York—135 Broadway

Chicago—105 S. Dearborn St.

London, E. C. 2, 12 Moor Lane

**Manufacturers of Line Material, Insulators, Circuit Breakers, Heavy Knife Switches,
Automatic Time Switches, Charging Plugs and Receptacles**



This is what Wise Companies do!

They hitch their cars to the Texaco Star. And their power plants, too, for that matter.

The Texas Company is lubricating completely scores of leading electric street railway lines. These lines have found that Texaco Lubricants have given them the satisfaction of reduced maintenance and better service, the satisfaction of smoother operation with lower final cost.

When we say Texaco products are completely lubricating these roads, we mean they are doing their efficient work in every part of the power plant and on every part of every car.

If your company has not learned why other roads are using *Texaco exclusively*, you should call on a Texaco engineer and go into the matter. We pride ourselves in being "Lubricating Specialists to the Electric Street Railway Field."

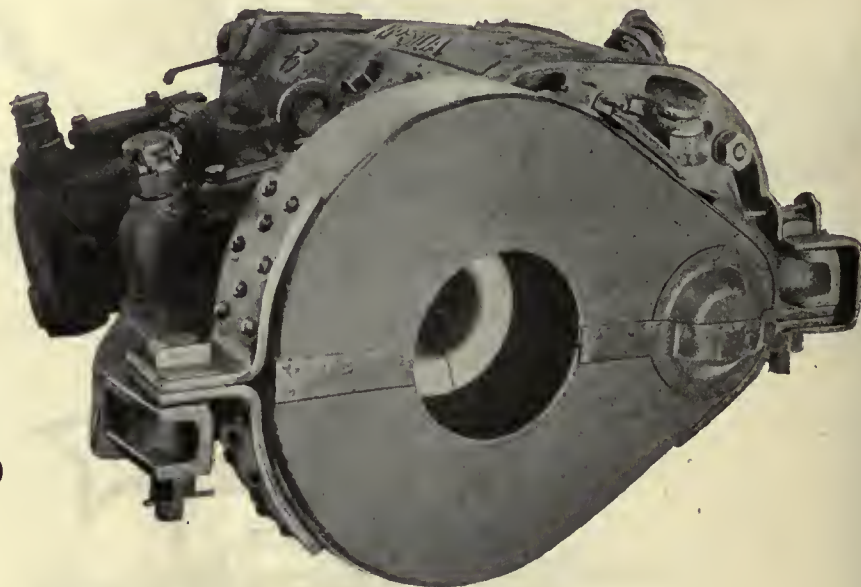
There is a TEXACO LUBRICANT for Every Purpose



THE TEXAS COMPANY
DEPT. R-J · 17 BATTERY PLACE · NEW YORK CITY
HOUSTON · CHICAGO · NEW YORK
OFFICES IN PRINCIPAL CITIES



For lightness—strength—low maintenance



**GEAR CASE
FOR W. H. 510
MOTOR**

CHILLINGWORTH ONE PIECE GEAR CASE

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New York

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*Ramapo Auto-
matic Return
Switch Stand
Style No. 37*



Safety at Switches on high-speed lines

Ramapo Automatic Return Switch Stands are used for private right-of-ways on prominent electric railways for safety over switches at passing tracks and sidings. A powerful spring allows the car to pass through switch, returning the point tightly to the original setting.

A conspicuous target indicates positively the position of the switch point, either open or closed, and reveals the danger if the point is held partially open by any obstruction.

The throw is rigid. The springs in the base fixture do not intervene between the hand lever, switch stand spindle and switch points. They are a part of the base fixture, to which the throwing mechanism is latched when the hand lever is lowered.

Made in various styles and sizes—dwarf and full height
Styles No. 37, No. 38 and No. 39



**Switches
Crossings**

**Frogs
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F. C. S. Wheels

From the Standpoint of both
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CHILLED IRON WHEEL is
the ideal wheel for *all classes*
of service.



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axles, boring and mounting wheels

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Pacific Coast Representative:

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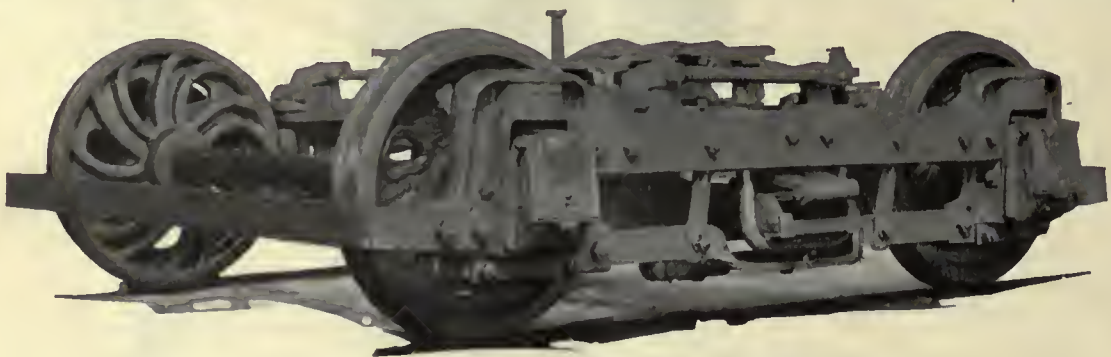
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Export Representative: United States Steel Products Co., 30 Church St., N. Y.

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determine the merits of the TAYLOR TRUCK**



Note the positive element of safety in the location of the one-piece bolster swing hanger over the bottom side frame member—Spring or spring plank cannot drop and cause derailment.

TAYLOR ELECTRIC TRUCK CO., TROY, N. Y.
Truck and Spring Manufacturers

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Motor bearing upkeep is a serious item, as you know. "**Hoffmann**" Precision Roller Bearings minimize it—not only because of their rugged strength but also because they can be mounted with magazine lubrication that needs renewal only at long intervals.

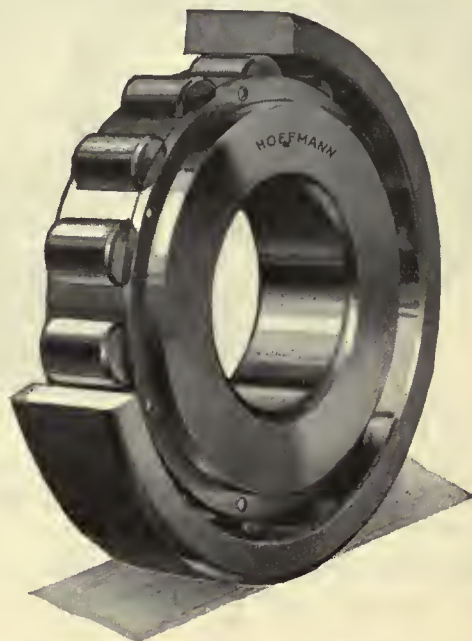
There's the tremendous steady load capacity you need — the large temporary overload capacity you've wished you could have — the rugged strength and simplicity that stand shock, jar and vibration—the precision that makes the "**Hoffmann**" a true anti-friction bearing.

*Our engineers are ready to meet yours, with convincing facts proving that you will save money and get more mileage per motor bearing, by equipping your traction motors with "**Hoffmanns**."*

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PRECISION ROLLER BEARINGS



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During this period we have matched stride for stride the general progress of the industry so that today we can offer expert advice as Axle Specialists.

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Railroad and Electric Car Axles.
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Locomotives; Passenger, Freight
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Steel Worm and Gear and Pinion
Blanks.
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Finished Turned, Carbon or Alloy
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Accurate Quick Permanent

THE sale of transportation is strictly a retail proposition and should comply with those methods which have been found most successful in other lines of merchandising.

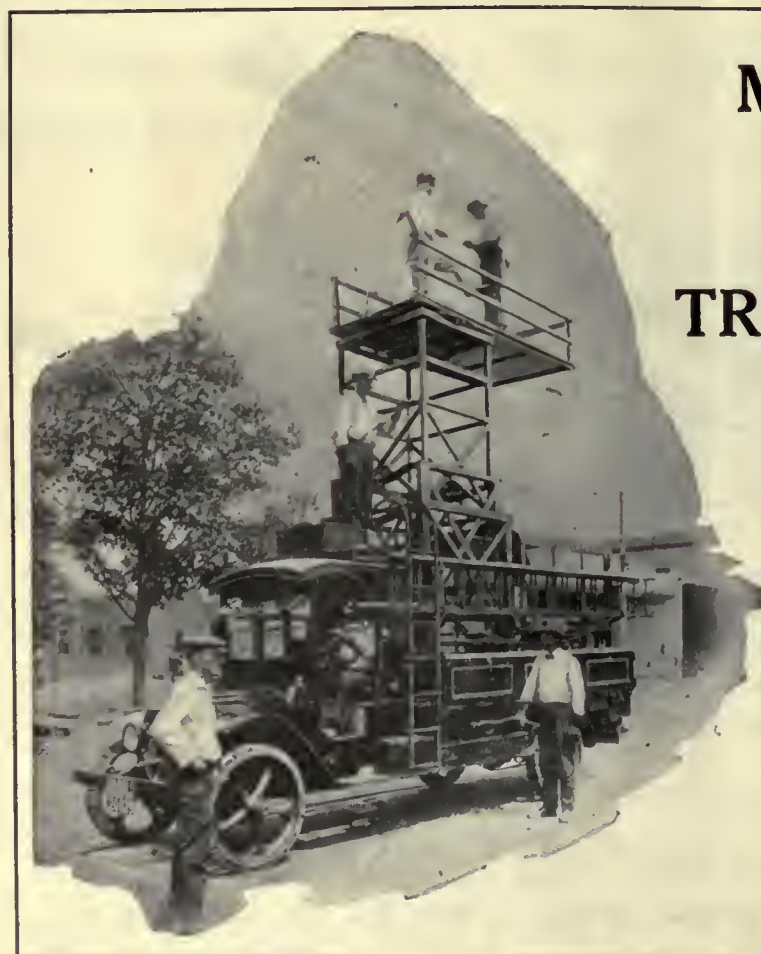
Ohmer Fare Registers indicate and record the exact amount and class of each fare paid.

They apply to electric railway and motor bus operation those methods which have brought success to countless retail merchants.

We manufacture Ohmer Fare Registers, Ohmer Taximeters, Atco Taximeters, Ohmer Odometers, Ohmer Fare Boxes, and Ohmer Recordographs.

OHMER FARE REGISTER COMPANY

Dayton, Ohio, U. S. A.



Maintenance with McCardell's 3-section TRENTON TOWERS

Shown at the left is one of the latest types of Trenton Towers, which affords the greatest possible range of height—11 ft. 6 in. over-all when collapsed, to 22 ft. (ground to platform) when fully extended. Especially adapted, on account of its great height, to painting and other maintenance or emergency work on poles. Hoisting controls located at driver's seat. Adapted to both electric and gasoline-driven trucks—any standard make chassis.

Trenton Towers are built with sturdy, well-designed sections, made to afford a firm substantial footing for workmen when fully extended.

EST. 1884

J. R. McCARDELL CO.
TRENTON, N. J., U. S. A.



For Safe, Speedy Service

For over 25 years United States Electric Signals have been the standard of safety for many electric railway companies. They are depended upon to provide safe and speedy service—as these signals have always proved reliable under typical service conditions.

Incorporated in Type K-2, shown above, is every up-to-

date safety feature. A red light for night and a red disc for day provide double stop indications. Signal lenses are 5 in.—discs 8 in.

Duplicate lighting. Counting in-and-out feature up to 15 cars.

For further particulars write us today.

UNITED STATES ELECTRIC SIGNAL CO., LOUISVILLE, KENTUCKY

Representatives: Western: Frank F. Bodler, Monadnock Bldg., San Francisco.
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CAR RECEIPTS AT A GLANCE

with

International Fare Registers

Single and double

Instantaneous—Accurate



R-11 DOUBLE REGISTER



B-12 ELECTRIC BACK

A thoroughly modern fare registration system that wins the confidence of not only the public, but also the car operator and the accounting department. International Registers may be furnished with electrical or mechanical, hand or foot control.

Write now for our Catalog. Then equip your new cars with "Internationals."

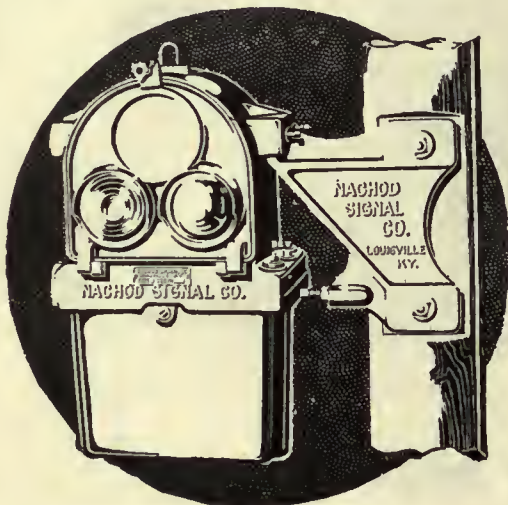
General Selling Agents for

HEREEN ENAMEL BADGES

The International Register Company

No. 15 South Throop Street, Chicago, Ill.

N-A-C-H-O-D SPELLS SAFETY



Nachod Automatic Block Signals are extremely simple to install, to operate and to maintain. They are controlled from overhead contactors, give duplicate indications of colored lights and disks—visible day or night under all weather conditions.



Nachod Crossing Signals give three kinds of warning. They ring a bell, swing a wig-wag, or flash lights. The most careless drivers will stop at these signals.

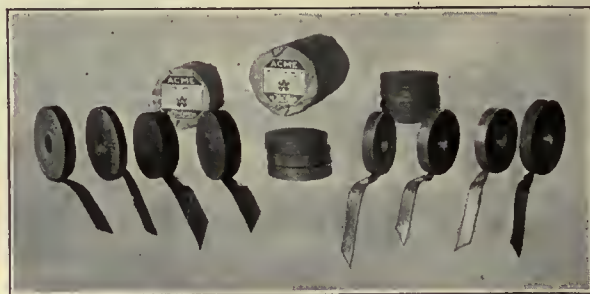
Nachod Headway Recorders provide an efficient check on actual headways, 24 hours a day, at any points on your lines. They are a great aid in maintaining regular schedules.



Write for full particulars.

Nachod Signal Company, Inc.
Louisville, Kentucky

ACME WIRE PRODUCTS



BIAS CAMBRIC TAPES FOR SHOP USE

The man in the shop is the best judge of tapes. We make them to suit him. In the Sewed Bias Tape, the stitching is finer and the butted seam thinner. We need only 48 seams in a 72-yard roll. Some tapes have as many as 55!

The Acme sewed seams are so thin they do not need to be cut out.

Acme Seamless Bias Tape comes in any width and in thicknesses from .007 in. to .015 in.; rolls of 72 yards all one piece of cloth, or special length rolls where required.

Acme Varnished Cambric Tapes are made in either yellow or black, and with dry, tacky or greasy finish.

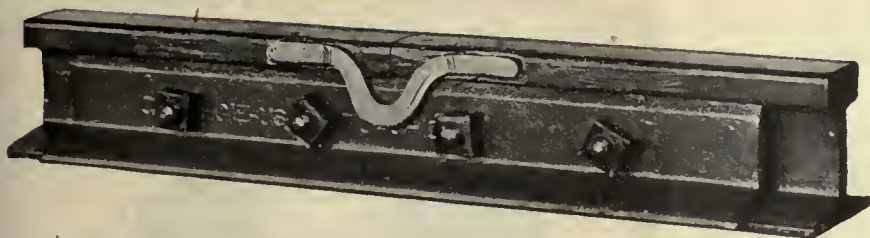
Ask for Catalog 3J

It contains tables and complete data on Varnished Insulations.

THE ACME WIRE CO.
Main Office and Plant
NEW HAVEN, CONN.

New York
52 Vanderbilt Ave.
Boston
80 Federal Street

Chicago
427 West Erie St.
Cleveland
Guardian Bldg.



Upper illustration.

Type EA Brazed bond, with laminated copper conductor. Well adapted for bonding thin ball of light, or girder rail. See Circular No. 12 for sizes and other types of Brazed Bonds.

Lower illustration.

Type ATF Arc Weld bond, with forged steel terminals and twin cable conductor. For arc weld bonding of the ball of rail of 60 lbs. or over. Circular No. 13 covers the various sizes of this and other arc weld bonds.



Before you begin your spring bonding write us for better and lower cost bonding methods.

The Electric Railway Improvement Co.
2070 East 61st Place, Cleveland, O.

Simple Sure Inexpensive

The application of ERICO rail bonds is made by simple apparatus, thru a simple method, and the quality of the job is easily ascertained as the work progresses, by simple, visual means.

This simplicity assures uniform and reliable bonding—the results are “sure fire” each time. The bonding is both permanently conductive and mechanically strong.

Carefully designed ERICO bonding equipment and a standardized method eliminate all interference with car schedules and reduce the total time required for bonding. Owing to the initial low price of ERICO bonds, the non-interference with traffic, and the rapidity of application, the installed cost per bond is surprisingly low.



Miami rides on Thomas Cars

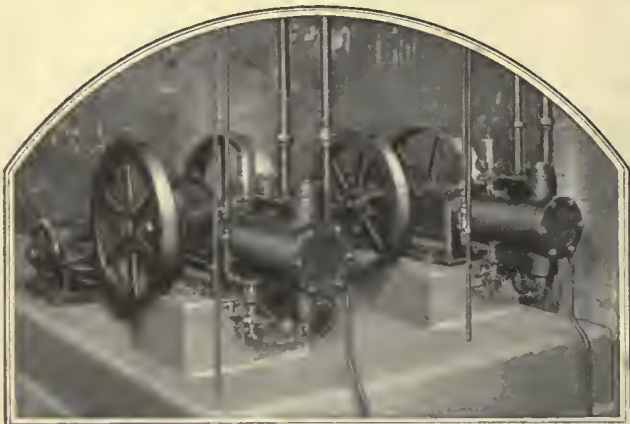
With thousands of people pouring into Florida, transportation facilities had to be expanded.

To meet this demand for increased service the Miami Beach Railway Company recently ordered twelve new Thomas Cars of the type shown above.

Our facilities enable us to make prompt deliveries of Thomas Cars to other electric railways having similar service requirements.

Your specifications will receive our closest attention. Ask for quotations.

PERLEY A. THOMAS CAR WORKS
High Point, N. C.



Depend upon Sullivan "WG-6" Air Compressors

SULLIVAN air power engineers have made the "WG-6" small, belted compressors sturdy, dependable, almost automatic, so simple that they are seldom "out of order," but with the same quality built into them in design, in materials, and in painstaking workmanship, that distinguishes the largest and most costly Sullivan compressors.

Hundreds of new "WG-6's" are installed every year, and give their owners steady, dependable service, in the shop or on the construction job.



Sullivan Wafer Valve and Spring, with assembly on seat in center

Sullivan "Wafer" Valves

are one element in "WG-6" satisfaction.

Light, thin steel discs, held to their seats by flat springs of the same material, form the valves of Sullivan "WG-6" compressors.

Wide, short, port openings, lightness, low lift, simplicity and long life are "Wafer" valve features.

Capacities, 68-500 cu. ft.

Bulletin 3277-K

Portable Air Compressors in desirable capacities and drives are described in Bulletin 3277-N



BRAKE SHOES

AERA Standards Brake Heads



Diamond "S" Steel Back and Lug Shoes best for all equipment.

Manufactured and sold under U. S. Patent and Registered Trade Mark.

American Brake Shoe and Foundry Co.
30 Church Street, New York

332 So. Michigan Ave., Chicago

T. S. Q.
says

"I save repair costs."

Tool Steel Quality

The Tool Steel
Gear and Pinion Co.
CINCINNATI, O.

You're having brush trouble

CORRECT IT

USE LE CARBONE CARBON BRUSHES

They talk for themselves

COST MORE PER BRUSH
COST LESS PER CAR MILE

W. J. Jeandron

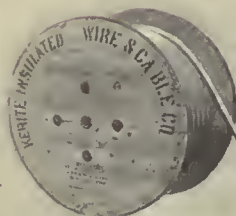
Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.

Pittsburgh Office: 634 Wabash Bldg.

Chicago Office: 1657 Monadnock Block

San Francisco Office: 525 Market Street

Canadian Distributors: Lyman Tube & Supply Co., Ltd.,
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KERITE

in a half-century of
continuous production,
has spun out a record
of performance
that is
unequalled in the
history of insulated
wires and cables

THE KERITE INSULATED WIRE & CABLE COMPANY INC.
NEW YORK CHICAGO



**DON'T
REMOVE
WORN
WHEELS**

This shoe does the work while your
car is in service.

SAVES TIME—SAVES LABOR—
SAVES MONEY

WHEEL TRUING BRAKE SHOE CO.
Detroit, Mich.

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY

Johnstown, Pa.

Sales Offices:

Atlanta	Chicago	Cleveland	New York
	Philadelphia	Pittsburgh	
	Pacific Coast Representative:		
	United States Steel Products Company		
Los Angeles	Portland	San Francisco	Seattle
Export Representative:			
United States Steel Products Company, New York, N. Y.			



Cold Dinners

for your passengers?

Not if you use

AJAX

BABBITT for ARMATURES

keeps the rolling stock rolling



The Ajax Metal Company

Established 1880

PHILADELPHIA

NEW YORK

CHICAGO

BOSTON

CLEVELAND

**Whenever you
need**

poles, ties or switch
timbers, we offer you a re-
liable source of supply.

LIVE CHESTNUT POLES

30, 35 and 40 ft. lengths

COOK TIE & POLE COMPANY

Commercial Trust Building, PHILADELPHIA, PA.

Let us quote

on all your requirements—
as we can give you both fair
prices and quick deliveries.



Use only Awebco Tape on your Armatures
Field Coils have better protection when wound with
"AWEBCO Tape." Send for samples.

ANCHOR WEBBING COMPANY
300 Brook Street, Pawtucket, Rhode Island

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley
Wheels and Harps has been
demonstrated by large and small
electric railway systems for a
period of thirty years. Being
exclusive manufacturers, with
no other lines to maintain, it is
through the high quality of our
product that we merit the large
patronage we now enjoy. With
the assurance that you pay no
premium for quality we will
appreciate your inquiries.



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KALAMAZOO, MICH., U. S. A.



Reg. U. S. Pat. Office

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AMELECTRIC PRODUCTS
BARE COPPER WIRE AND CABLE
TROLLEY WIRE
WEATHERPROOF WIRE
AND CABLE
PAPER INSULATED
UNDERGROUND CABLE
MAGNET WIRE

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Boston, 176 Federal; Chicago, 112 W. Adams;
Cincinnati, Traction Bldg.; New York, 100 E. 42nd St.

ELRECO TUBULAR POLES



COMBINE

Lowest Cost
Least Maintenance

Lightest Weight
Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO
New York City, 30 Church Street



AIMco Electric Railway
Automatic
Signals

**for Accessibility
and Reliability**

EST. 1885 **AIMco** INC. 1918
"American"
INSULATING
MACHINERY
COMPANY

Philadelphia, New York, Paris, England

Sales Agents:
Electric Service Supplies Co.
Philadelphia New York Chicago



Important Factors of "Ideal" Trolley Wheels

Of the many important factors two are out-
standing: the light soft-stamped, low carbon
steel flanges which take the wear and tear
of side thrust on the wire—and the integral
cast copper-tin alloy contact ring and hub
which provides for current collection with
minimum resistance.

These wheels insure greater mileage, closer follow-
ing of wire at high speed, and smooth, silent run-
ning.

Request complete information—also sample for test
purposes.

Sales Representatives

R. D. Nuttall Co.
Pittsburgh, Pa.
Also all Westinghouse
E. & M. Co. and
General Electric Co.
District Offices.

Edward P. Sharp

L. E. Harmon, Prop.
27-31 Mechanic St., Buffalo, N. Y.

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of
Water Tube Boilers
of continuing reliability

BRANCH OFFICES

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PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Tracton Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building



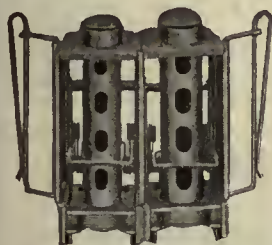
WORKS
Bayonne, N. J.
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Makers of Steam Superheaters
since 1898 and of Chain Grate
Stokers since 1893

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SAN JUAN, Porto Rico, Royal Bank Building

JOHNSON Universal Changer



Adjustable

The best changer on the market. Can be adjusted by the conductor to throw out a varying number of coins, necessary to meet changes in rates of fares.

Flexible

Each barrel a separate unit, permitting the conductor to interchange the barrels to suit his personal requirements, and to facilitate the addition of extra barrels.

JOHNSON FARE BOX COMPANY

Ravenswood, Chicago, Ill.

Instantaneous Registration by the Passenger ROOKE of fare collection— SYSTEM

Meets every condition for all types of cars and buses. The stand device, as shown, adapts it to one-man uses—making register portable or stationary, at option. Handles nickels, dimes, quarters, or metal tickets, in any combination, FLEXIBILITY with CERTAINTY.



Rooke Automatic Register Company Providence, R. I.



FARE BOXES for BUSES

Let us tell you of this especially designed box for this class of service.

The Cleveland Fare Box Co.

4900 Lexington Ave., Cleveland, O.

Canadian Cleveland Fare Box Co., Ltd.
Preston, Ontario

COIN COUNTING And Sorting Machines CHANGES CARRIERS Tokens

HIGH SPEED CHANGE CARRIERS

1925 model
—without
rivets—
ready for
delivery



Supplied in
one or four
tube combinations

Essential wherever the rapid and accurate handling of change is required. Now included in the standard equipment of largest Traction Companies because conductors demand them.

Prices and Literature sent on request

J. L. GALEF, 75 Chambers St., N. Y. C.

Exclusive Manufacturer's Selling Agent



We make a specialty of ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC
on your equipment

The Universal Lubricating Co.

Cleveland, Ohio

Chicago Representatives: Jameson-Ross Company,
Straus Bldg.

B. A. HEGEMAN, Jr., President C. C. CASTLE, First Vice-President
H. A. HEGEMAN, Vice-Pres. and Treas. F. T. SARGENT, Secretary
W. C. PETERS, Manager Sales and Engineering

National Railway Appliance Co.

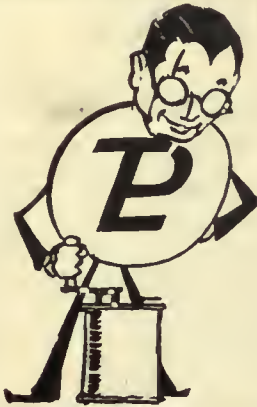
Grand Central Terminal, 432 Lexington Ave., Cor. 45th St., New York

Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Bell Locked Fare Box and Change
Maker
The Aluminum Field Colls
Walker Tractor Snow Plows
Cutler-Hammer Electric Heaters
Genesco Paint Oils
Garland Ventilators
Flaxlinum Insulation
Yellow Coach Mfg. Co.'s Single
and Double Deck Buses.
B. G. Spark Plugs

Economy Electric Devices Co.'s
Power Saving and Inspection
Meters
Anglo-American Varnish Co.,
Varnishes, Enamels, etc.
National Hand Holds
Ft. Pitt Spring & Mfg. Co.,
Springs
Anderson Slack Adjusters
Feasible Drop Brake Staffs
Dunham Hopper Door Devices



There's more to a car than the Controller

Every part that goes into the assembly of your electric cars should be carefully inspected and tested to make sure they function properly and meet your exacting specifications. P. T. L. Inspectors, located in the large industrial centers, are thoroughly familiar with your service requirements and guarantee a rigid inspection and test of every item entering into the manufacture and assembly of your purchases.

Bulletin No. 28 tells how we do it in detail. Write to-day.

PITTSBURGH TESTING LABORATORY

PITTSBURGH

*Inspecting Engineers and Chemists
Branch Offices in the Principal Cities*

PENNA.

ROEBLING

WELDING CABLE

ELECTRICAL WIRES and CABLES

John A. Roebling's Sons Company, Trenton, N. J.

100 New Users in the Last Nine Months
KASS SAFETY TREADS

HIGH

in efficiency and lasting qualities
LOW

in weight, initial and upkeep costs

Morton Manufacturing Co., Chicago

Chapman

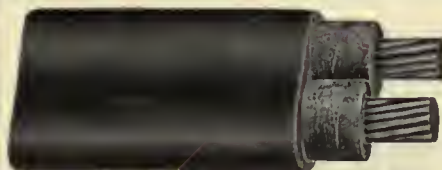
Automatic Signals

Charles N. Wood Co., Boston



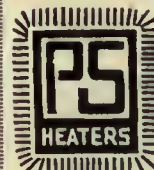
NAUGLE POLES

WESTERN & NORTHERN CEDAR
NAUGLE POLE & TIE CO.
59 E. MADISON ST. CHICAGO ILL.
New York • Columbus • Kansas City • Spokane • Vancouver • Boston



Standard
Underground
Cable Co.

General Offices
Pittsburgh, Pa.
Branches in all
principal cities



Car Heating and Ventilation

are two of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

The Peter Smith Heater Company
6209 Hamilton Ave., Detroit, Mich.

Northern **CEDAR POLES** Western

We guarantee

all grades of poles; also any butt-treating specifications

BELL LUMBER COMPANY

Minneapolis, Minn.

INDUSTRIAL GASES

OXYGEN
ACETYLENE

IOG
SYSTEM

HYDROGEN
NITROGEN

Quick shipment and low prices also on cylinders, valves, torches, regulators and supplies.

International Oxygen Co., Main Offices: Newark, N. J.
Branches: New York Pittsburgh Toledo



"Your Air Pumps will work better and cheaper" when equipped with

EVER-TYTE Piston Rings

EVER-TYTE PISTON RING DIV.

ST. LOUIS

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut



STUCKI SIDE BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.
Positions Vacant and all other classifications, 8 cents a word, minimum charge \$2.00.
Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.
Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....\$4.50 an inch
4 to 7 inches.....4.30 an inch
8 to 14 inches.....4.10 an inch
Rates for larger spaces, or yearly rates, on request.
An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

POSITIONS WANTED

ENGINEER of twenty years' experience in construction and maintenance of paved and open track, overhead lines and buildings, desires position as engineer of way. PW-876, Electric Railway Journal, Real Estate Trust Bldg., Phila., Pa.

SUPERINTENDENT transportation, qualified by a wide experience and successful record on large city and interurban properties; successful in handling labor. Public relations, safety campaigns, etc., recognized as an efficient, progressive official fully capable of getting results. At present engaged. Personal reasons for desiring change. High-class references from leading executives. Correspondence invited. PW-858, Electric Railway Journal, 401 Guardian Bldg., Cleveland, Ohio.

WANTED CARS

16 second-hand, 4 ft. 8 1/2 in. gauge, seating about 48 passengers, complete with electrical equipment.

HENRY LEVIS & CO.
Commercial Trust Bldg., Philadelphia, Pa.

WANTED TO BUY BIRNEY CARS

2—Prefer Brill Cars with West. 508 motors, in first class condition.

THE UNION TRACTION COMPANY
Coffeyville, Kansas

Rails WeBuy and Sell
entire equipment
of Electric Railways, including Rails, Cars, Wiring, Conduits, Etc.

Get Our Bids or Ask
for Prices

Hyman-Michaels Company
Peoples Gas Bldg., Chicago
New York St. Louis Pittsburgh
San Francisco Dallas (76)

4 High Grade! High Speed! Combination 56-Passenger (Smoking and Baggage Sections) Cars

Exceptionally good cars for Interurban Service

All in excellent condition. Built by Kuhlman. Length over all, 57 ft. Height over trolley board, 12 ft. 5 in. Height over all, 13 ft. 10 in. Number of seats, 26. Seating capacity, 56. Tyoe of motors, four G. E. 205. Make of trucks, Brill. Wheels base, 7 ft. Controller, G.E.—MC—74. Toilets, 34-in.x26-in. Air Compressor, WHD 2.

Also four 46 passenger cars and smaller cars for one- or two-man operation.

Complete details on request.

J. W. GERKE, Railway Equipment, 303 Fifth Ave., N. Y.



FOR SALE

20—Birney Safety Cars, Brill built. Seating 32.
8—Steel Interurbans, 48 ft. long. Seating 52.

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

BARGAIN PRICE

Steel Cars

Four practically new one-man light weight double truck—26 inch wheels—quadruple 25 H.P. Motors—DH16 Air Compressors.

Wire or Phone

Transit Equipment Company
Cars—Motors
501 Fifth Ave., New York City

The SEARCHLIGHT Advertising in This Paper

is read by men whose success depends upon thorough knowledge of means to an end—whether it be the securing of a good second-hand piece of apparatus at a moderate price, or an expert employee.

The Best Proof

of this is the variety of this journal's Searchlight ads. Without a constant and appreciable demand for such machinery or service, by its readers, the market-place which these advertisements represent could not exist for any length of time.

Are you using the Searchlight Section?

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Christensen Air Brakes Co.

Air Circuit Breakers
Roller-Smith Co.

Air Receivers & Aftercoolers
Ingersoll-Rand Co.

Ammeters
Roller-Smith Co.

Anchors, Guy
Elec. Service Supplies Co.
Graybar Electric Co., Inc.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Appraisals
Amer. Appraisal Co.

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Door Equipment
Manganese Steel Forge Co.

Automatic Brake Switch
Stand
Ramapo Ajax Corp.

Automatic Safety Switch
Stand
Ramapo Ajax Corp.

Automobile Trucks
General Motors Truck Co.

Axles
Illinois Steel Co.
Johnson & Co., J. R.
Shuler Axle Co.
Standard Steel Works
St. Louis Car Co.
Taylor Electric Truck Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Car Wheel
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Johnson & Co., J. R.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Axles, Front & Rear, Motor
Truck & Passenger Car
Timken-Detroit Axle Co.

Axles, Rear
Clark Equipment Co.

Axles, Steel
Carnegie Steel Co.
Johnson & Co., J. R.

Axles, Trailer & Motor Bus
Timken-Detroit Axle Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.,
The

Babbitting Devices
Columbia Machine Wks.

Babbitt Metal
Ajax Metal Co.

Barges, Steel
American Bridges Co.

Batteries, Dry
National Carbon Co.
Nichols-Lintern Co.

Bearings, Roller and Ball
Norma Hoffman Bearing Co.
S. K. F. Industries

Bearings and Bearing Metals
Ajax Metal Co.
Columbia Machine Wks.
General Electric Co.
More Jones Brass & Metal
Co.

Bearings, Center and Roller
Side
Stucki Co., A.

Bearings, Roller
Hyatt Roller Bearing Co.

Bells and Gongs
Brill Co., The J. G.
Columbia Machine Wks.
Consolidated Car Heating
Co.
Elec. Service Supplies Co.
Graybar Electric Co., Inc.
St. Louis Car Co.

Benders, Rail
Railway Track-work Co.

Body Material, Haskellite & Plymet
Haskellite Mfg. Corp.

Rollers
Babcock & Wilcox Co., The

Roller Hanger Wear Plates
Manganese Steel Forge Co.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry
with Names of Manufacturers and Distributors Advertising in this Issue

Bolts, Nuts, Rivets
Russell Burdall & Ward
Bolt & Nut Co.

Bolts and Nuts, Track
Illinois Steel Co.

Bond Testers
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Roller-Smith Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
Graybar Electric Co., Inc.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Graybar Electric Co., Inc.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse Elec. & M. Co.

Book Publishers
McGraw-Hill Book Co.

Brackets and Cross Arms
(See also Poles, Ties, Posts
etc.)
American Bridge Co.
Bates Expanded Steel Truss
Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Graybar Electric Co., Inc.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Nat'l Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Brake Shoe & Fdry.
Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.
Taylor Electric Truck Co.
Wheel Truing Brake Shoe
Co.

Brakes, Brake Systems and
Brake Parts
Brill Co., The J. G.
Columbia Machine Wks.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Tr. Br. Co.

Bridges, Steel
American Bridges Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co.
National Carbon Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite
Morganite Brush Co.
National Carbon Co.

Brushes, Wire, Pneumatic
Ingersoll-Rand Co.

Brush Holders
Anderson Mfg. Co., A. &
J. M.

Buskheads
Haskellite Mfg. Corp.

Bunkers, Coal
American Bridge Co.

Bus Rods
Anheuser Busch

Bus Seats
Heywood-Wakefield Co.

Buses, Motor
Auto Body Co.
Brill Co., The J. G.
Graham Bros.
International Harvester Co.
Mack Trucks
St. Louis Car Co.
Yellow Coach Mfg. Co.

Brushings, Case Hardened and
Manganese
Brill Co., The J. G.
St. Louis Car Co.

Cables
(See Wires and Cables)

Cambric Tapes, Yellow &
Black Varnish
Irvington Varnish & Ins. Co.

Cambric Yellow & Black
Varnish
Mica Insulator Co.

Carbon Brushes
(See Brushes, Carbon)

Car Lighting Apparatus
Elec. Service Supplies Co.

Car Mfrs. Ass'n
Railway Car Mfrs. Ass'n.

Car Panel Safety Switches
Consolidated Car Heating
Co.
Westinghouse Elec. & M. Co.

Car Steps, Safety
Irving Iron Works

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Differential Steel Car Co.,
Inc.
St. Louis Car Co.

Cars, Gas Rail
St. Louis Car Co.

Cars, Passenger, Freight
Express, etc.
American Car Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhman Car Co., G. U.
National Ry. Appliances Co.
St. Louis Car Co.
Thomas Car Works.
Perley A.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
General Electric Co.

Cash Fare Receipts
Rand McNally Co.

Castings, Brass, Composition
or Copper
Ajax Metal Co.
Anderson Mfg. Co., A. &
J. M.
Columbia Machine Wks.
More Jones Brass & Metal
Co.

Castings, Gray Iron and Steel
American Bridge Co.
Amer. Steel Foundries
Columbia Machine Wks.
Horne & Ehling
St. Louis Car Co.
Standard Steel Works
Wm. Wharton, Jr. & Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry.
Co.
Columbia Machine Wks.
St. Louis Car Co.

Catchers and Retrievers,
Trolley

Earl, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Bradley Co.
Graybar Electric Co., Inc.

Crilling Car
Haskellite Mfg. Corp.
Pantastote Co.

Chairs, Parlor Car
Heywood-Wakefield Co.

Chasing Plate
Manganese Steel Forge Co.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.
Galef, J. L.

Circuit Breakers
General Electric Co.
Roller-Smith Co.
Westinghouse Elec. & M. Co.

Clamps and Connectors for
Wires and Cables
Anderson Mfg. Co., A. M. &
J. M.

Coat and Ash Handling
(See Conveying and Hoisting
Machinery)
Columbia Machine Wks.
General Electric Co.
Westinghouse Elec. & M. Co.

Cleaners and Scrapers, Track
(See also Snow-Flows,
Sweepers and Brooms)

Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
Ohio Brass Co.
Root Spring Scraper Co.
St. Louis Car Co.

Clusters and Sockets
General Electric Co.

Coat and Ash Handling
(See Conveying and Hoisting
Machinery)

Colla, Armature and Field
Columbia Machine Wks.
Economy Electric Devices
Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coil Binding and Winding
Machines
Columbia Machine Wks.
Electric Service Supp. Co.
Westinghouse Elec. & M. Co.

Colla, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines
Cleveland Fare Box Co.
Galef, J. L.
International Register Co.
The
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.
Galef, J. L.

Coin Wrappers
Cleveland Fare Box Co.
Galef, J. L.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
-Cameron Elec'l Mfg. Co.
Columbia Machine Wks.
General Electric Co.
Westinghouse Elec. & M. Co.

Compressors, Air
General Electric Co.
Graybar Electric Co., Inc.
Ingersoll-Rand Co.
Sullivan Machinery Co.
Westinghouse Tr. Br. Co.

Compressors, Air Portable
Ingersoll-Rand Co.
Sullivan Machinery Co.

Compressors, Gas
Sullivan Machinery Co.

Condensers
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Elec. & M. Co.

Condenser Papers
Irvington Varnish & Ins. Co.

Conduits, Underground
Std. Underground Cable Co.

Connectors, Solderless
Dossert & Co.
Frankel Connector Co.
Westinghouse Elec. & M. Co.

Connectors, Trailer Car
Consolidated Car Heating
Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Control Systems
Monitor Controller Co.

Controllers
Amer. Brown Boveri Elec.
Corp.

Controller Regulators
Electric Service Supplies Co.
Monitor Controller Co.

Controllers, Automatic,
Electric
Monitor Controller Co.

Controllers, Electric
Monitor Controller Co.

Controllers, Motor
Monitor Controller Co.

Controllers or Parts
Columbia Machine Wks.
General Electric Co.
Westinghouse Elec. & M. Co.

Controllers, Rheostatic
Monitor Controller Co.

Controllers, Speed
Monitor Controller Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & M. Co.

Converters, Rotary
Amer. Brown Boveri Elec.
Corp.
General Electric Co.
Westinghouse Elec. & M. Co.

Conveying & Hoisting
Machinery
American Bridge Co.

Copper Wire
American Steel & Wire Co.
Anaconda Copper Mining Co.
Rome Wire Co.

Cord, Bell, Trolley, Register,
etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co.,
The

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St. Louis Car Co.
Samson Cordage Works
Silver Lake Co.

Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
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Brill Co., The J. G.
Ohio Brass Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Crane Controller, Electric
Monitor Controller Co.

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Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing Foundations
International Steel Tie Co.

Crossing Frogs and Switches
Ramapo Ajax Corp.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing Signals, (See Signal
Systems, Highway Cross-
ing)

Crossings, Track, (See Track,
Special Work)

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Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains and Curtain Fix-
tures
Brill Co., The J. G.
Morton Mfg. Co.
Pantastote Co.
St. Louis Car Co.

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Electric Equipment Co.
Gerke, J. W.
Hyman-Michaels Co.
Lewis & Co., Henry
Transit Equipment Co.

Derailing Switches, Tee Rail
Ramapo Ajax Corp.

Destination Signs
Columbia Machine Wks.
Electric Service Supplies Co.

Detective Service
Wish Service, P. Edward

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National Pneu. Co., Inc.
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Hale-Kilburn Co.
St. Louis Car Co.

Doors, Folding Vestibule
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Inc.

Draft Rigging, (See Coupl-
ers)

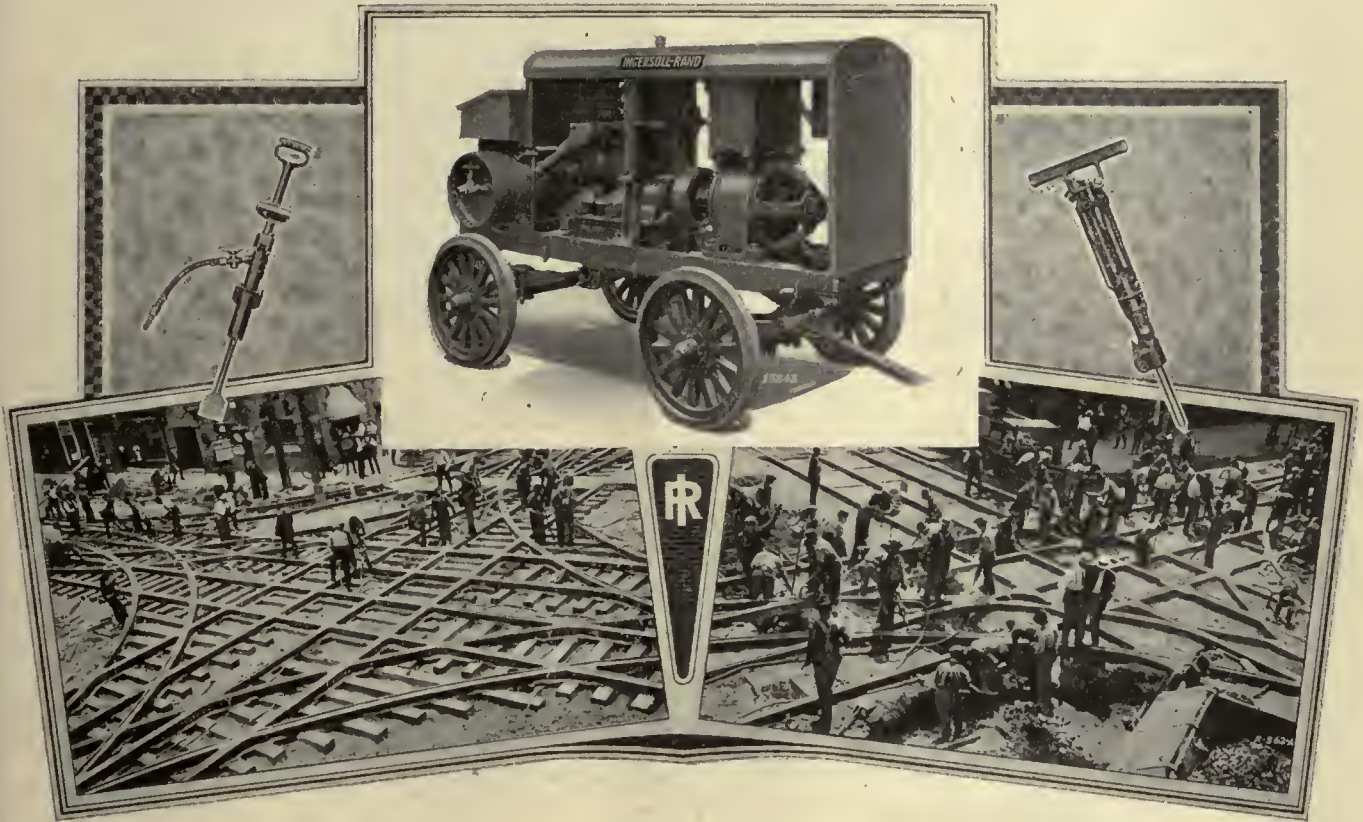
Drills, Rock
Sullivan Machinery Co.

Drills, Track
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Two very effective means of reducing track work costs

Ingersoll-Rand Pneumatic Tie Tamper tamp track at less than half the cost of doing the job by hand methods. It has been definitely proved on dozens of roads that four men with pneumatic tampers will tamp more track, and do a better job, than 12 to 16 men using hand methods.

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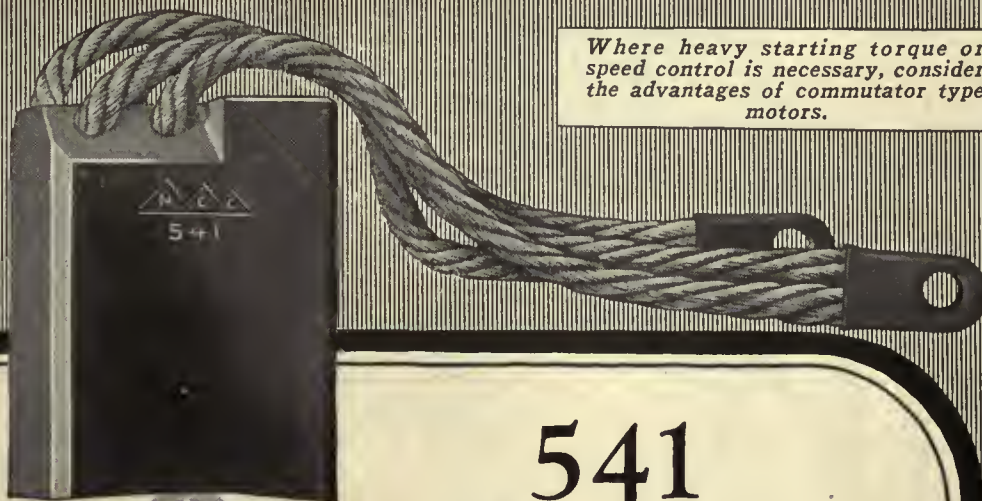
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Irving Iron Works**Flooring, Open, Steel**
Irving Iron Works**Flooring, Steel, Subway**
Irving Iron Works**Flooring, Ventilating**
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Wm. Wharton, Jr. & Co.**Guard Rails, Tee Rail & Manganese**
Ramapo Ajax Corp.
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St. Louis Car Co.
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- Steel and Steel Products**
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Morton Mfg. Co.
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- Strand**
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Monitor Controller Co.
- Switches, Remote Control**
Monitor Controller Co.
- Switches, Selector**
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- Switches, Tee Rail**
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- Switches, Track (See Track, Special Work)**
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- Tampers, Tie**
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- Tapes and Cloths (See Insulating Cloth, Paper and Tape)**
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Dayton Mechanical Tie Co.
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Carnegie Steel Co.
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Carnegie Steel Co.
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Columbia Machine Wks.
Electric Service Sup. Co.
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St. Louis Car Co.
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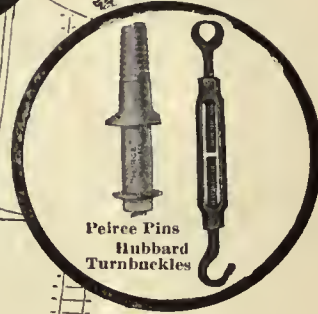
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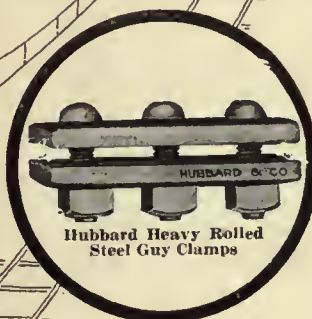
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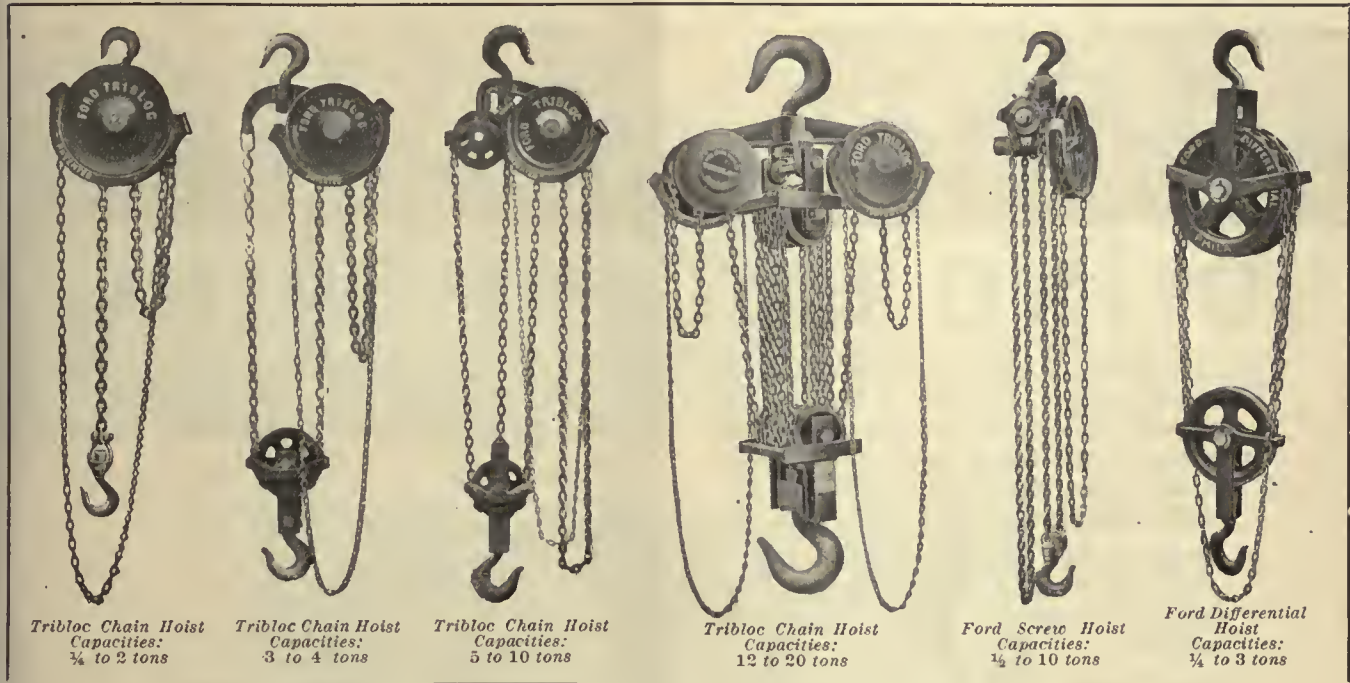


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Ford Tribloc Chain Hoists are built in many types to supply the many hoisting requirements of industrial plants and other users. A few of the more widely used types are shown here. Information on our complete line promptly furnished on application. Send for Catalog 7-B.



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The Motor-Driven Chain Hoist

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Dependable Power for Every Purpose



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Continental Bus Motors deliver the cor-

rect power output to balance bus capacity, plus reliability, long life, easy maintenance and economical operation.

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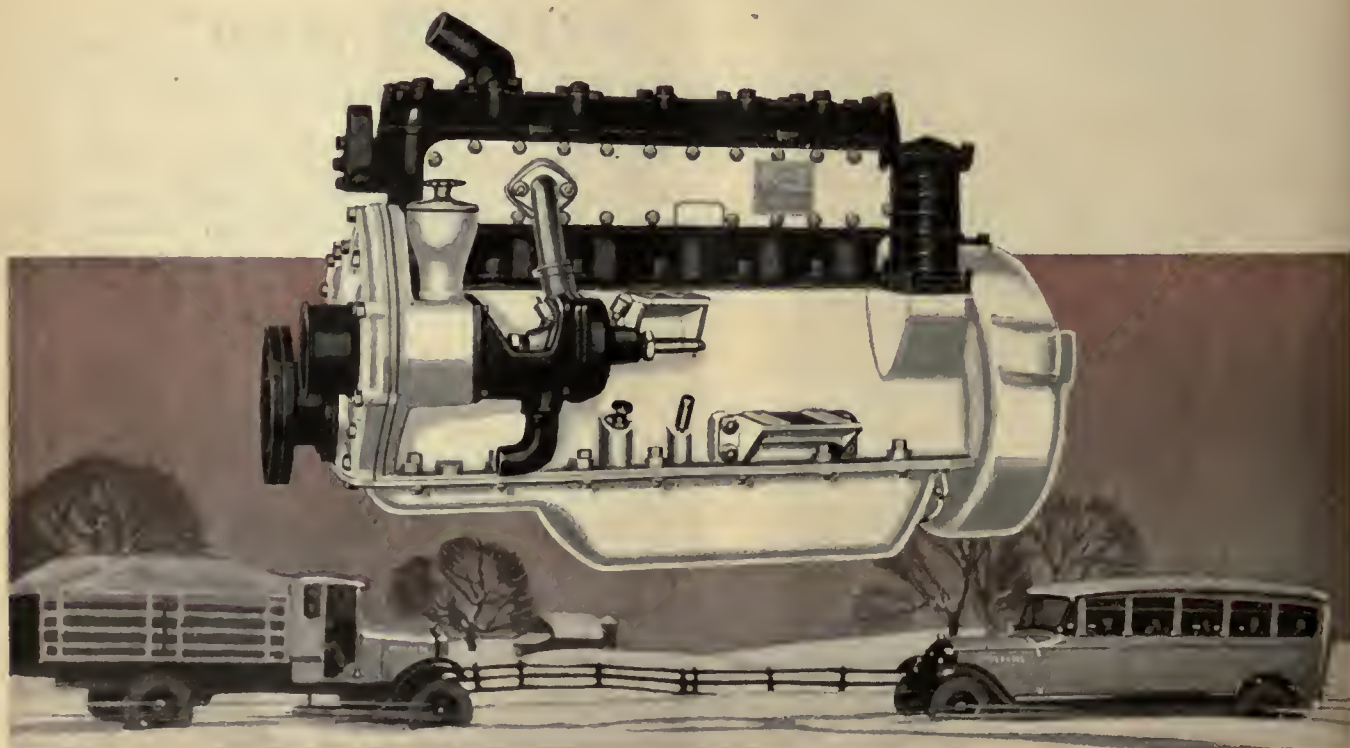
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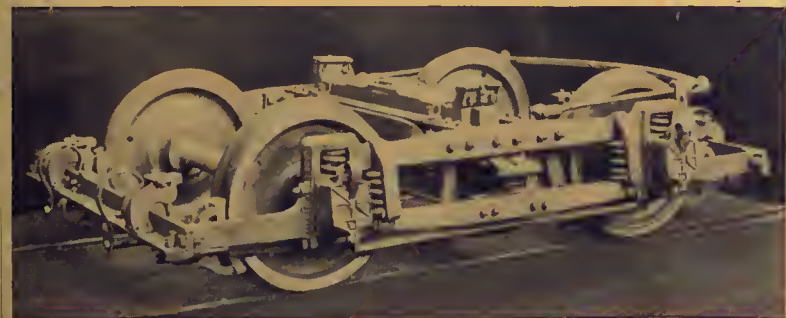
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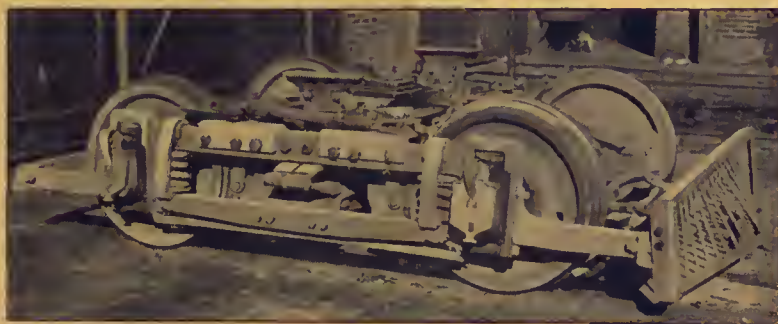
Lehigh Traction Keeps Step With Truck Improvements

1.



After nineteen years
you wouldn't think it
the same truck

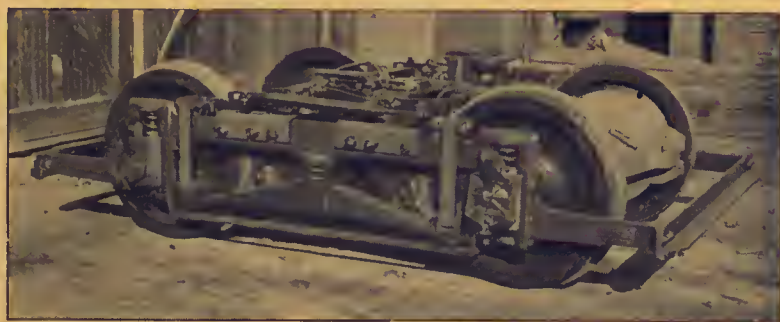
2.



The first step—

was taken two years ago after this Brill 27-E type truck had been in service 17 years. The brake rigging was changed to the inside-hung type with Brill Half-ball Brake Hangers, affecting a saving of 250 lb. per truck in weight.

3.



And now—

Reduces Truck Weight

700 lb. or 1400 lb. per car, besides modernizing truck equipment and improving service.

other improvements have just been completed, involving steel type bolster, Brill Bolster Guides, Semi-elliptic Springs and Brill Twin Links with the Brill Graduated Spring System in place of the full-elliptic type springs, resulting in an additional saving of 450 lb. per truck.



THE J. G. BRILL COMPANY

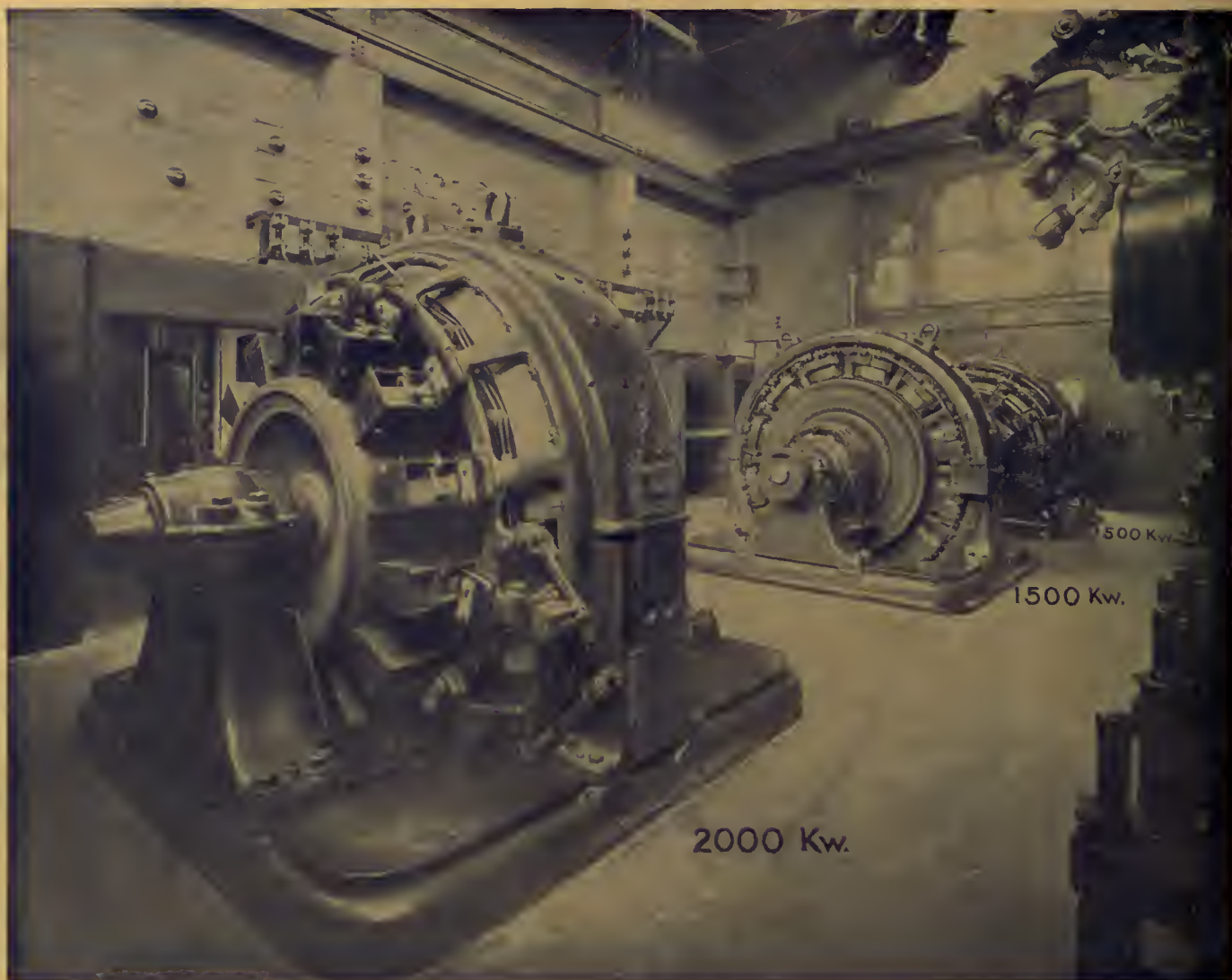
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Reliable power back of San Francisco trolleys



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G-E Railway Synchronous Converters are being preferred by railway engineers particularly because of two important features:

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HIGH-RELUCTANCE COMMUTATING POLES maintain the proper flux to insure commutation under severe load conditions. They enable the converter to withstand many disturbances and prevent service interruption.

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ELECTRIC RAILWAY JOURNAL



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In the year that ended last August 1, the eleven White Busses carried a total of 322,881 passengers.

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THE railroads, having faith in the growing prosperity of our country and realizing the important place that transportation occupies in our industrial development, are making large expenditures to meet the transportation requirements. Trunk line electrification is a major improvement which must not be overlooked, as it makes possible the handling of through passenger and freight trains with the greatest ease, dispatch, and dependability.

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No. 2

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Service Doesn't Just Happen

SOMETIMES we become so accustomed to receiving certain service that we are apt to forget that it isn't simply automatic—that carefully planned human endeavor is needed to produce it. So it is with many of us in regard to the postal service. We take it as a matter of course. And sometimes a reader who does not give the matter consideration may overlook the character of service that ELECTRIC RAILWAY JOURNAL has rendered its industry for more than forty-one years. For that reason it is particularly gratifying to have an old subscriber write us what he thinks of the paper. A recent comment of this kind is as follows:

"In the period during which I have received your magazine I have always found it up to date in every respect, excellently organized, well supplied with material, ably edited and most thoroughly covering its field. It is the best technical publication of any kind that I have seen."

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BASEBALL and football games, hockey, boxing, basketball, lectures, recitals, all bring added profit to the street railway which has the reserve capacity to handle such crowds.

Reserve capacity is best provided by Westinghouse automatic substations which are free from attendance costs.

These substations are on the line only when needed.

They make practical the location of the substations at load

centers, thereby resulting in a saving of feeder copper, and in better voltage regulation.

Westinghouse automatic switching equipment gives unequalled protection to the apparatus, and lessens the liability of expensive shut-downs for repairs entailing loss of revenue and loss of good will.

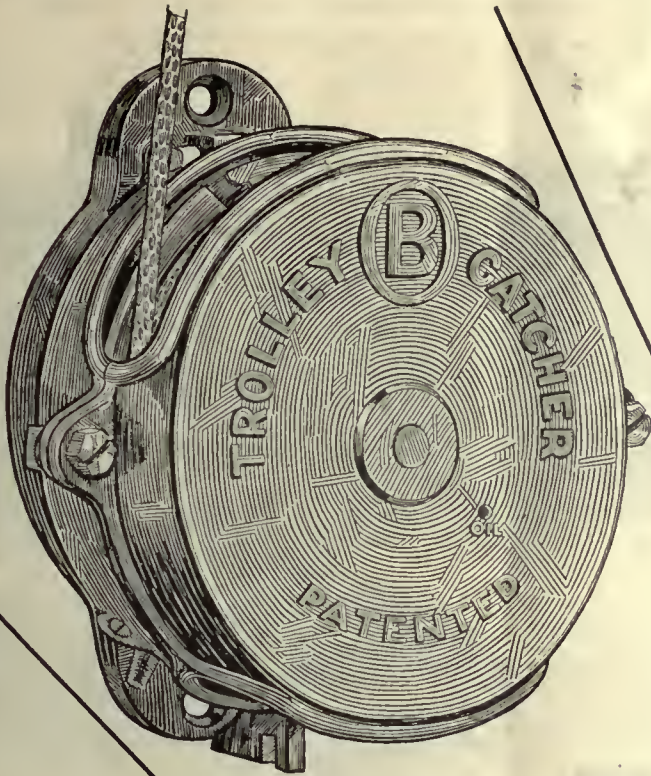
Better protection also reduces maintenance costs. It assures minimum interruption of service with maximum safety for equipment.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania

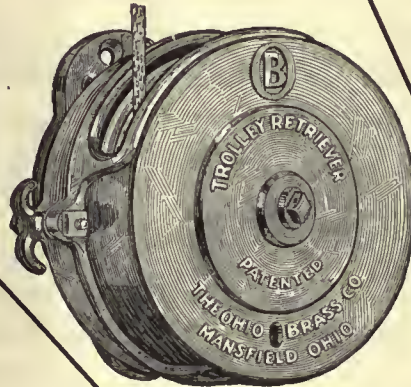
Sales Offices in All Principal Cities of
the United States and Foreign Countries



Westinghouse



O-B Trolley Catchers and Retrievers are packed in individual cartons, easily handled in the store room.



WHICH WOULD YOU PREFER—several spans of trolley line put out of commission by a flying trolley pole, or real overhead protection by means of good trolley catchers and retrievers?

Of course the mechanical department "should worry about line expense." But the line superintendent will holler about the needlessness of this trouble and the transportation superintendent will complain about this avoidable delay in his service.

What master mechanic wants to leave himself thus vulnerable before the G. M.? In the end any expense comes out of the same pocketbook.

The occasion for catching or retrieving action may be infrequent. Avoiding tearing down the overhead just once will pay for O-B Catchers or Retrievers on many of your cars.

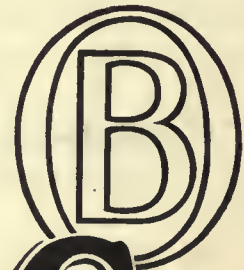
And don't forget that O-B Catchers and Retrievers have a reputation for going into action at the critical moment—at the instant they are needed—every time a dewirement occurs, and that may be pretty frequently.

OHIO BRASS COMPANY

Mansfield

Ohio

Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada



Ohio Brass Co.

PORCELAIN INSULATORS LINE MATERIALS RAIL BONDS CAR EQUIPMENT MINING MATERIALS VALVES



Helping a City's Traffic Problem



As an aid in the solution of city transportation problems many street-railway companies are operating two-car multiple unit trains on lines where traffic is heavy. A valuable equipment for such service is the Westinghouse "Tight Lock" Car and Air Coupler. By means of this device both the mechanical and pneumatic connections are made between cars at the instant of impact.

These connections are made automatically—thus saving valuable time; they are made without the necessity for trainmen to go between the cars, and are held rigidly together by the "tight lock" feature. The convenience, safety, and economy in make-up and operation of trains is thereby increased.

Type K-1 Coupler, which automatically makes mechanical and pneumatic connections between cars.

Electrical connections may also be made by incorporating a set of contacts in the coupler head. This is the K-1-A Type.



Westinghouse Traction Brake Company

General Office and Works: Wilmerding, Pa.

WESTINGHOUSE TRACTION BRAKES



The rear wheels of this truck rest on a typical longitudinal cross-section of track using wood ties—the front wheels on a standard steel tie cross-section. Notice how the wood ties break up the paving support and reduce its depth while the steel tie track is all effective as paving foundation.

The Concrete Is Both Paving Base and Track Support With *Steel Twin Ties*

Another point about Steel Twin Tie Construction of growing importance in these days of heavy vehicle loading on track and paving — *the concrete used acts as a direct paving support as well as a well designed track foundation.*

There are no points as in wood tie construction, where the paving foundation is reduced in depth by a perishable material which

divides the concrete into 16-inch blocks.

Such advantages of twin tie track are backed up by first-cost savings in concrete excavation and material, which make this quality construction cost less than wood ties in ballast.

*We are now offering cost figures collected during 1925.
May we send them to you?*

THE INTERNATIONAL STEEL TIE COMPANY
Cleveland, Ohio

Pantasote
for car seats and curtains
Agasote
for roofing, headlining,
interior trim



North, South, East and West

Wherever electric cars
are operated you'll find
Pantasote and Agasote

*In the
great industrial cities*

*Pantasote Products
would not be so
universally used un-
less Economy pre-
vailed after all!*

*Specify them for your buses
also!*

WARNING!

**There is
no substitute
for Pantasote**

Bridgeport, Conn.
Philadelphia, Pa.
New York, N. Y.
Newark, N. J.
Rochester, N. Y.
Providence, R. I.
Springfield, Mass.
Worcester, Mass.
Akron, Ohio
Cleveland, Ohio

Chicago, Ill.
Detroit, Mich.
Milwaukee, Wis.
Rockford, Ill.
Grand Rapids, Mich.
Hartford, Conn.
Dayton, Ohio
Springfield, Ohio
Columbus, Ohio
Toledo, Ohio

Go into any of these key cities of American Industry and you will find Pantasote and Agasote in service on their electric railway systems.

Some use Pantasote for car curtains, some for car seats, some for both. Agasote you'll find as a roof material, as a headlining and as a general interior trim.

The point is, that Pantasote Products have been ordered and re-ordered over periods up to 25 years and more

Such a record can mean only one thing,—*basically satisfactory and economical service.*

And you too can be assured of such service by specifying and insisting upon only *genuine* Pantasote and Agasote.





The road to Coral Gables— and its Keystone equipped cars

ALL eyes are turned to Florida. Its sudden leap into unparalleled prominence, as the Winter Paradise of America, has focussed attention on every item of news emanating from within its borders.

No wonder, then, that the railway field has noted with unusual interest the details of the Coral Gables Car. Its lines and general design are reminiscent of the old Spanish type of architecture, while its equipment and auxiliary devices include only the latest and best in modern transportation practice.

The choice of numerous items from the Keystone line is typical.

Hunter-Keystone
Destination Signs

Golden-Glow
Headlights

Faraday
Passenger Signal System

Keystone
Rotary Gongs

ELECTRIC SERVICE SUPPLIES Co.

PHILADELPHIA
17th and Cambria Sts.

PITTSBURGH
839 Oliver Building

BOSTON
88 Broad St.

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

NEW YORK
50 Church St.

SCRANTON
316 N. Washington Ave.

CHICAGO
Illinois Merchants' Bank Bldg.

DETROIT
General Motors Building

The Operator's Check

Partial List of Electric Railways Now Operating Mack Buses

✓ Municipal Tramways Trust, Adelaide, S. Australia
 Illinois Power & Light Corp., Chicago, Ill.
 The Connecticut Co., New Haven, Conn.
 Chicago, West Towns & Northern Railroad, Chicago, Ill.
 Lehigh Traction Co., Hazleton, Pa.
 United Electric Railway Co., Providence, R. I.
 Columbus Railway, Power & Light Co., Columbus, Ga.
 Boston Elevated Railway, Boston, Mass.
 Waterloo, Cedar Falls & Northern Railroad, Waterloo, Iowa
 Northern Ohio Traction & Light Co., Akron, Ohio
 Illinois Power Co., Springfield, Ill.
 Boston & Worcester Street Railway Co., Framingham, Mass.
 Mississippi Valley Electric Co., Iowa City, Iowa
 New Orleans Public Service Co., New Orleans, La.
 Tampa Electric Co., Tampa, Fla.
 Chicago, South Bend & Northern Railroad, Chicago, Ill.
 Chicago & Joliet Electric Railway Co., Chicago, Ill.
 Key West Electric Co., Key West, Fla.
 Iowa Southern Utilities Co., Inc., Des Moines, Iowa
 Holyoke Street Railway Co., Holyoke, Mass.
 Durham Public Service Co., Durham, N. C.
 Coast Counties Gas & Electric Co., San Francisco, Cal.
 Hartford & Springfield Street Railway Co., Hartford, Conn.
 Worcester Consolidated Street Railway, Worcester, Mass.
 Youngstown Municipal Railway, Youngstown, Ohio
 Binghamton Railway Co., Binghamton, N. Y.
 Wisconsin Power & Light Co., Madison, Wis.
 Kansas City Railways, Kansas City, Mo.
 Iowa Railway & Light Co., Des Moines, Iowa
 Omaha & Lincoln Railway & Light Co., Omaha, Neb.
 Arkansas Central Power Co., Little Rock, Ark.
 City of Ashtabula, Ashtabula, Ohio
 Twin City Rapid Transit Co., St. Paul, Minn.
 Wilkes-Barre Railway Co., Wilkes-Barre, Pa.
 Phillipsburg Traction Co., Phillipsburg, N. J.
 Wilmington & Philadelphia Traction Co., Wilmington, Del.
 Nashua Street Railway Co., Nashua, N. H.
 Union Street Railway Co., New Bedford, Mass.
 Baton Rouge Electric Co., Baton Rouge, La.
 Lordship Railway Co., Bridgeport, Ct.
 Municipal Railway, Eureka, Calif.
 Trenton & Mercer County Traction Corp., Trenton, N. J.
 Illinois Power & Light Corp., Decatur, Ill.
 Wichita Ry. & Light Corp., Wichita, Kans.
 Topeka Railway Co., Topeka, Kans.
 Illinois Power & Light Corp., Bloomington, Ill.
 Duluth Street Railway Co., Duluth, Minn.
 Mesaba Railway Co., Virginia, Minn.
 Kansas City, Leavenworth & Western Ry., Kansas City, Mo.
 Oklahoma Union Railway Co., Tulsa, Okla.
 Virginia Ry. & Power Co., Norfolk, Va.
 Syracuse Co-ordinated Bus Line, Inc., Syracuse, N. Y.
 Utica Co-ordinated Bus Line, Inc., Utica, N. Y.
 Third Ave. Ry., New York City
 Camden & Suburban Ry., Camden, N. J.
 Dubuque Electric Co., Dubuque, Ia.



The first bus was a Mack
the first Mack was a bus



Typical Performance 21 Macks in City Service of The Connecticut Company

Since the first Mack Bus was purchased in May, 1923, the Connecticut Company, of New Haven, Conn. have placed twenty more Macks in city service. Their action duplicates that of other railway companies who have repeatedly come back for more.

Repeated starting and stopping—rough going on slippery streets—day and night—summer and winter—City Service, the gruelling test of stamina! In this service, the first Mack has rolled up 70,000 revenue-producing miles, with many more to come for the Connecticut Company.

And this is by no means remarkable for a Mack Bus. It is just a typical example of what transportation knowledge and long experience in design and manufacture can translate into bus performance. It is the kind of performance which gains the confidence of railway operators. It is the kind of performance that

gives Mack the leadership in solving transit problems. It is the kind of performance that builds Mack fleets.

Service hours, hours on the road, passenger hours. These are Mack hours. Why? Because behind Mack buses is an organization with one objective—to produce a transportation unit in which is incorporated every feature of design and convenience for maximum earning capacity. In personnel, in engineering experience and in manufacturing facilities, Mack is geared to do this—for *you*.

The many exclusive features which build up revenue-producing mileage are explained in detail in the new Mack catalog No. 93. Write for a copy.

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York City

Ninety-five direct MACK factory branches operate under the titles of: "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," "MACK MOTOR TRUCK COMPANY," and "MACK TRUCKS of CANADA, Ltd."



The
Mack
Bus

"OURS AVERAGE 20,000 MILES"



Goodyear-equipped bus of The Jefferson Highway Transportation Company, Minneapolis, Minn.

"We have been in the bus operation business going on eight years," writes Mr. Edgar F. Zelle, President of the Jefferson Highway Transportation Company, Minneapolis, Minn., "and now operate 25 buses, serving 35 municipalities.

"Since we started operating we have used every type of tire, and have now concentrated entirely on Goodyear Tires, due to the excellent service they have rendered and the low cost per mile.

"The tires average 20,000 miles, and we have one instance where a tire has traveled 63,000 miles.

"These are remarkable mileage figures, inasmuch as the buses travel every day throughout the year and over all sorts of roads."

* * *

Goodyear Bus Tires make records for long, economical, trouble-free mileage wherever they are used. The Goodyear Bus Tire line offers you the particular tire that is suited to your operating conditions.

For every Goodyear Cord Bus Tire there is an equally fine Goodyear Tube, built especially to the needs of bus service

GOODYEAR

Copyright 1926, by The Goodyear Tire & Rubber Co., Inc.

ALWAYS FOR PROGRESS!

"Modernize—Pneumatize!"

This familiar slogan has characterized National Pneumatic advertising for many years.

The movement to bring railway rolling stock up to date is heartily endorsed by the National Pneumatic Company as an extension of its own long-standing policy.



NATIONAL PNEUMATIC EQUIPMENT for the modern car



Treadle-operated exit doors

One of the most progressive steps ever taken to simplify and economize traffic handling has been the widespread adoption of our treadle-operated exit doors. Particularly valuable in one-man trolley service, the automatic treadle door is also used to reduce platform expense and facilitate the operation of articulated units.

NATIONAL PNEUMATIC COMPANY

Executive Office, 50 Church Street, New York

General Works, Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building



Lang Bodies on the Road

You see them everywhere, their graceful lines blending along scenic highways or picking their way through city streets.

Framed in a background of mountainous country, desert sand or congested traffic, Lang Bodies are identified by their beauty of appearance and characteristic points of refinement that contribute to the personal comfort of passengers. And with beauty of line is combined strength of manufacture that *keeps* Lang Bodies on the road.

LANG
BODIES
Miles of Smiles
for Rider for Driver for Owner

DESIGNERS AND BUILDERS OF INDIVIDUALIZED BODIES
FOR THE BUS MANUFACTURING INDUSTRY.

THE LANG BODY COMPANY • CLEVELAND • O.

UNITED STATES BUS TIRES ARE GOOD TIRES

IF all the bus lines equipped with U.S. Royal Cord Bus-Truck Tires could be shown in one picture, most people would be surprised that there are so many buses in existence.

Take the illustration below as merely a small cross-section of such a picture. Note that bus lines from every part of the country are represented.

This is a graphic way of indicating the nation-wide

recognition of a U. S. Tire that was the first pneumatic *specifically* designed for bus service.

This pioneer in one of the greatest transportation developments of all time, is today a most dependable factor in the comfort, speed, safety and regularity of the modern motor coach.

The success of the U. S. Royal Cord Bus-Truck Tire is another triumph for those great inventions of U. S. Tire engineers—*Sprayed Rubber*, *Latex-treated Web Cord* and the *Flat Band Method* of building a tire.

United States  Rubber Company
Trade Mark



BATON ROUGE ELECTRIC CO. LOUISIANA

COLUMBUS ELECTRIC AND POWER CO. GEORGIA

PHILADELPHIA & WESTCHESTER TRACTION CO. PENNSYLVANIA

MUNCIE, IND.

ROCHESTER, N.Y.

WARREN TRANSIT CO. NEWTON FALLS, OHIO

WHITE STAR LINE PORTO RICO

WHEELING ST. CLAIRVILLE & CAMBRIDGE TRANS. CO. OHIO

PACIFIC ELECTRIC RAILWAYS CO. LOS ANGELES, CAL.

THE CONNECTICUT COMPANY NEW HAVEN, CONN.

DETROIT STREET RAILWAYS CO. DETROIT, MICH.

UTAH PARKS & UNION PACIFIC R.W.Y. CO.

PIERCE ARROW SIGHT-SEEING CO. SALT LAKE CITY.

SHASTA TRANSIT CO. SACRAMENTO, CAL.

WHITE STAGE LINE ST. PETERSBURG, FLA.

EAST SIXTH ST. TRANS. CO. TULSA, OKLA.

TENNESSEE TRANSIT CO. JOHNSON CITY, TENN.

TEXAS ELECTRIC RAILWAY CO.

INTER-CITY BUS LINE ST. LOUIS, MO.

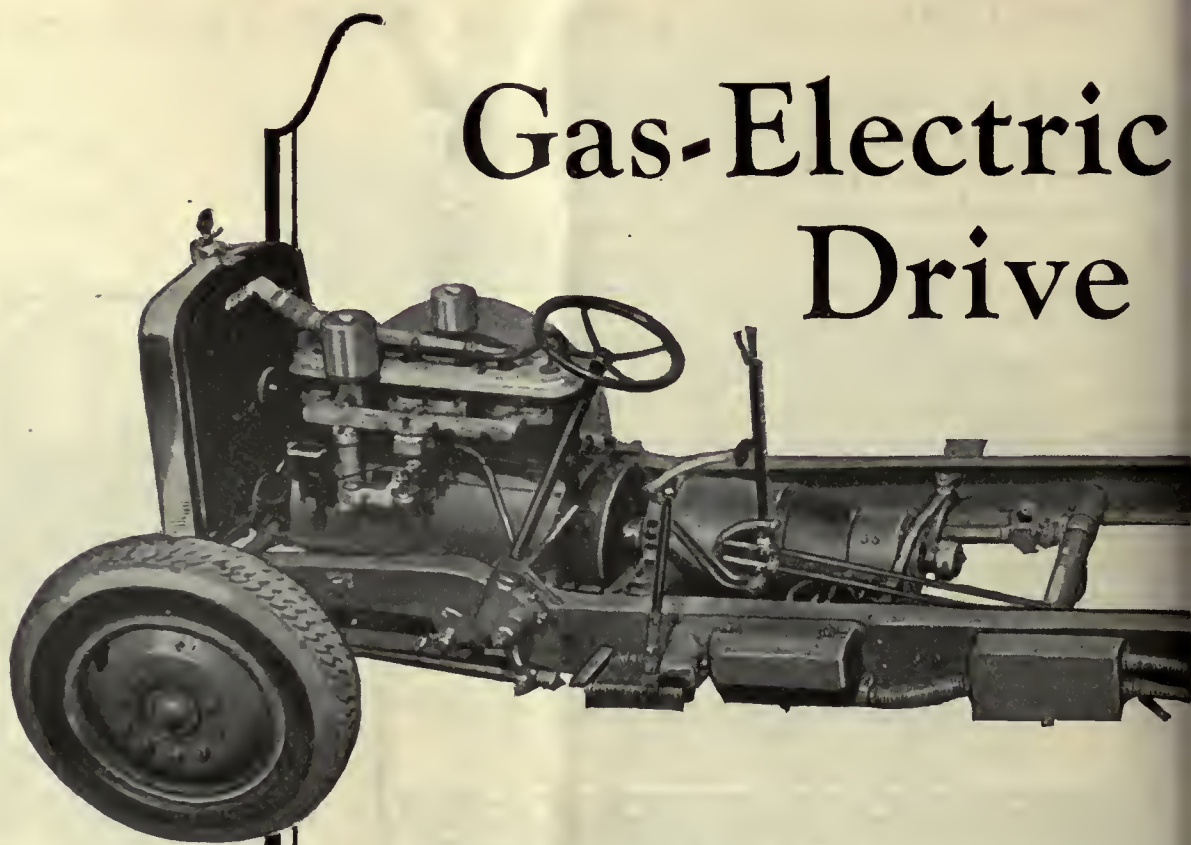
REO WORCESTER CO. WORCESTER, MASS.

MIDWEST TRANS. CO. MINNEAPOLIS, MINN.

BEATRICE-LINCOLN BUS-LINE NEBRASKA

U.S. Royal Cord Bus-Truck Tires

Built of Latex-treated Web Cord



Gas-Electric Drive

It has enabled bus operators to increase their schedule speeds as much as 20%. This is because the acceleration of gas-electric buses is automatic, dependent upon the electric equipment, not upon the skill of the driver.

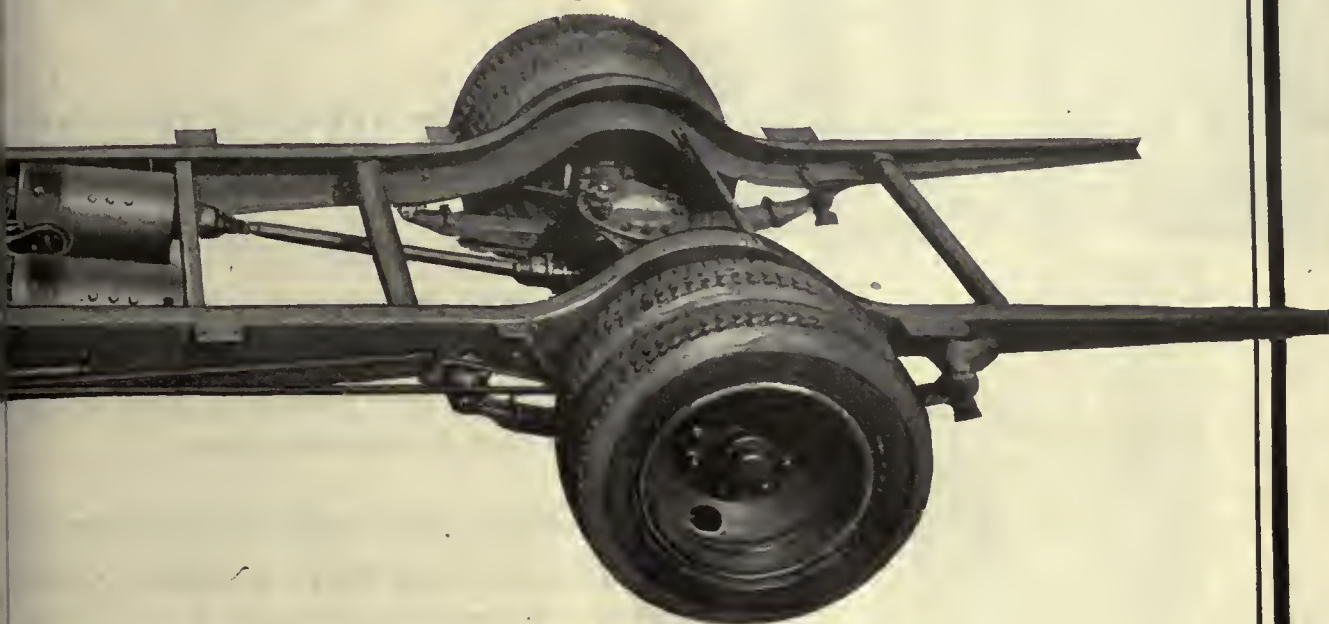


The name "General Electric" on bus equipment is a guarantee of reliable service. It means the same high degree of excellence in electrical equipment that has been recognized for years in other fields of transportation. Specify "General Electric" when you select the drive for your gas-electric buses.

GENERAL

GENERAL ELECTRIC COMPANY, SCHENECTADY, NEW YORK

the outstanding bus achievement of 1925



Interest in buses and automotive equipment in general is focused on this General Electric development—Gas-Electric Drive.

It is only a few months since the Philadelphia Rural Transit Company, acting upon its experience with a gas-electric bus in operation, placed its initial order for 215 buses equipped with G-E electric drive. In this short period the gas-electric bus has commanded the attention of students of transportation progress as no other single bus development has done.

Gas-electrics are already in operation in a half dozen other cities, representing all sections of the country.

No operator should make a final selection of bus equipment without first understanding the several important advantages of electric drive—listed below.

In Maintenance

Inspection and testing of engine are simplified, made systematic and conclusive.

Engine cannot be raced or stalled and average engine speed is lower—prolonging life of bearings, pistons, cams and all other moving parts.

Clutch, gears and differential—all subject to high maintenance—are eliminated.

Without the shock of gear changing, the life of engine, chassis and body is longer.

Uniform torque of electric drive means less tire wear.

Engine lubrication is materially less.

In Operation

Higher schedule speeds—through more rapid acceleration and reduction of driver fatigue—affording lower costs and higher receipts.

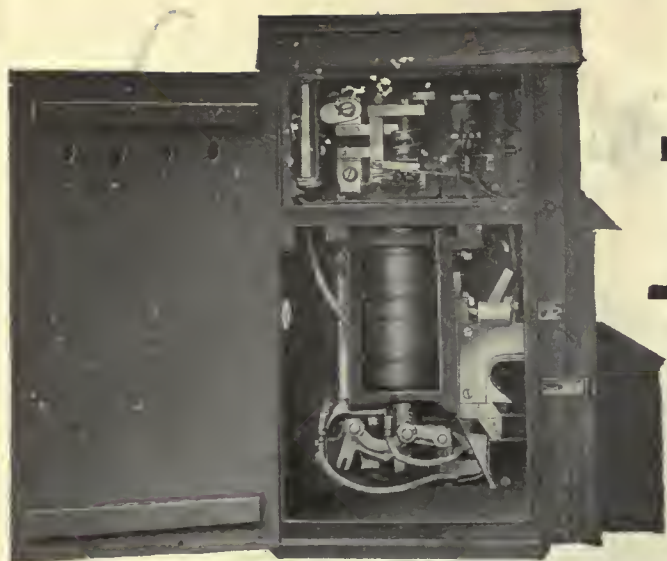
Greater riding comfort—no vibration or jerks during starting, and smooth acceleration.

Increased safety—control entirely in foot pedal relieves operator's hands for steering—skidding is minimized by individual drive on rear wheels—engine cannot stall on dangerous crossings.

11-77

ELECTRIC

SALES OFFICES IN ALL PRINCIPAL CITIES



100%

on your investment

Electric railways are getting this return from G-E Automatic Sectionalizing Switches. That is, the financial return realized the first year is at least equal to the cost of the switches.

Automatic Sectionalizing Switches return the scrap value of feeder copper they make unnecessary or save the cost of additional feeders that would otherwise be required.

In addition to this saving you can expect more reliable service, better schedule speeds and better car lighting, when Automatic Sectionalizing Switches isolate short circuits and improve trolley voltage conditions.

The application of these switches is an engineering problem. G-E engineers will co-operate in determining the adaptability of them to your distribution system.



GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN ALL LARGE CITIES

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

MORRIS BUCK, *Managing Editor*

Volume 67

New York, Saturday, January 9, 1926

Number 2

Baltimore Valuation Case Is of Special Interest

REALIZATION that transportation cannot be sold at a fixed price but that the price must vary from time to time, depending upon the cost of production, has now come to the public. The courts have determined, moreover, that this price must include a fair return on the fair present value of the property, and that present-day reproduction cost cannot be ignored in the determination of present value. It would seem to follow that present value must change from time to time whenever there are important changes in the unit costs of the materials and labor that enter into the construction of the property. In consequence, the question of properly valuing railway properties is one of continuing interest to all transportation executives.

For these reasons, a rather full statement of the way in which the United Railways & Electric Company of Baltimore presented its recent valuation case to the Maryland Public Service Commission is published elsewhere in this issue. The Baltimore property is one of the largest in the country. It had not previously been valued by the commission. Its officers had the opportunity of preparing a valuation case in the light of the multitude of previous decisions in other valuation cases rendered both by commissions and courts, and in the light of the valuable contributions that have been made to the subject by economists and valuation engineers.

Transportation executives and valuation engineers should therefore be interested in the attitude which the company has taken toward such questions, among others, as the significance of original cost, the weight to be attached to present-day reproduction cost, the measurement of going value, and the treatment of depreciation.

In particular, the claim of the company that original cost may serve either one of two purposes and must be defined according to the purpose which it is to serve and the attempt of the company to make an analysis of going value and lay the foundation for a definite measurement of at least its minimum amount open up interesting fields of discussion.

A Valuable Lesson from the Bus Industry

PROBABLY no one will deny that manufacturers of buses, as well as independent bus operators, display remarkable ingenuity and enthusiasm in salesmanship. Seemingly insurmountable difficulties are overcome with apparent ease. No stone is left unturned to put across their product. Why not generate the same ingenuity and enthusiasm both on the part of car and equipment manufacturers and of railway operators?

There has been witnessed a most rapid development of the bus unit from a sort of modified truck to the luxuriously appointed coach of today. The bus manufacturer has bent every effort to interpret the composite

public demands, and he has produced a vehicle that appeals to the rider's sense of beauty and refinement.

The auto rider who was satisfied five years ago to ride in a leather-upholstered open touring car today requires a closed mohair-upholstered sedan with all the incidental comforts. He sees in the de luxe bus an appeal to the same desires as the private automobile produces.

It is generally agreed that there is urgent need today for the retirement of large numbers of electric cars of obsolete design. There also exists a demand for an electric car which is substantially lighter than any developed to date, a car which is graceful in exterior lines, has a pleasing interior and one in which the noise of gears and the rattle of brake rigging has been eliminated. Close co-operation between the several car and equipment manufacturers and large railway properties is essential to the successful development of such a vehicle. Radical changes in design of car equipment may be necessary.

Car manufacturers should take the initiative just as have the bus manufacturers and develop the transportation unit desired. A demand exists and it should be met.

Getting the Message Across to the General Public

SKILL in the presentation of electric railway publicity material is of greater importance than the selection of the subject matter. Discussion of this question at a recent convention showed how numerous and varied are the opinions of railway men concerning the most effective type of advertising. Such diversity of opinion makes it rather difficult at times for the individual manager to decide which type would be best in his particular case.

Numerous companies favor good will advertising that has no direct connection with railway operation. Others stress details of their own work, such as shop overhaul methods or provision of snow-fighting equipment. Statistics, particularly cost figures, are a usual type of publicity material. Posters describing points of interest reached by the railway are utilized frequently.

Certain companies employ all of these forms while others believe some of them to be of little value. Good results have been obtained by each of these methods, however, and it appears likely that the secret of success lies largely in the skill displayed in the execution. The public is bombarded with every sort of advertising. It would be impossible for any one person to read all that is offered. The average man reads only such of it as arouses his interest. Few will read dull and uninteresting railway publicity matter simply because they realize that the subject is one of importance.

On the other hand, if the thought is dressed up in an attractive manner people will read regardless of whether the subject concerns details of railway oper-

ating practice, matters of general community interest or inducements to visit local points of interest. To be really effective, however, publicity material must be honestly written. Bait that has no connection with the story to be told is bad because it makes the reader feel that he has been deceived. If the real subject of the advertising cannot be made interesting, it might better be dropped. When it can be made interesting, however, every effort should be used to make it so. The railway which fails to do this is neglecting a wonderful opportunity.

Storm Clouds Threaten the Province of Ontario

MORE somber than blue is the shade that seems to predominate the railway horizon in the Province of Ontario, Canada, with clouds portending uncertainty and change hovering over the cities of Hamilton, London and St. Thomas. Efforts are being made to bring order out of chaos in Hamilton with the railway continuing service under a temporary agreement, but a transportation deadlock exists in London and the demise of the railway in St. Thomas seems probable. An outline of the facts is essential to the interpretation of these events. In Hamilton the franchise expires in 1927. At the municipal election held on Dec. 7 voters opposed the purchase of the railway by the city, as well as the granting of a 25-year franchise to the company, although they had been warned that something would have to be done if service were to be continued. The defeat came as a great surprise. Now further negotiations are in order and another agreement is likely to go before the voters.

The franchise in London expired not long ago and was automatically renewed for five years, but the city neglected to serve notice of its intent to purchase. The fares fixed by the London by-law are seven and nine tickets for a quarter. With the approval of the Legislature a 5-cent fare was charged for a year or so and the company continued to exact this charge until the Ontario Railway Board ordered the railway on Dec. 12 to revert to the old scale. The company followed with an ultimatum announcing withdrawal. In the emergency an agreement was reached whereby the Council granted the right to charge a 5-cent fare for a period of 60 days. This the company favored, with the proviso that after the first of the year buses and jitneys competing with the railway should be banned. The Council refused this request and the company withdrew its service. In this city, as in Hamilton, the generosity of the railway averted suspension during the holidays.

On the very day on which Hamilton voters vetoed both railway propositions residents of St. Thomas approved the plan to discontinue the railway and award operating rights to a bus company. This line, about 6 miles, will probably cease operating about March 1.

It is to be hoped that there will be a speedy adjustment of affairs and that the agreements in prospect will work to the mutual advantage of the patrons and the companies. Not so long ago another city of Ontario, St. Catharines, began a year under the auspicious occasion of a new franchise protecting the railway from bus competition. Let the new year result in contentment instead of conflict in the entire Province of Ontario. Interesting to outsiders it is that in the discussion in connection with all these cases the voice for municipal ownership is a thin, small one in a province previously noted for its pronounced sentiments of this kind.

The Wonder City of Florida Relies on the Electric Railway

CORAL GABLES, down in Florida, is a high-grade development in every sense of the word. To that end no stone has been left unturned. Here is an ideal community, ideally conceived, ideally planned and being ideally carried out. It has 150 miles of wide, paved streets, plenty of space for parking, excellent conditions for the use of the bus, the taxi and the private auto. But the promoters see a town destined to grow and they realize that growth is dependent on adequate transportation facilities, which are not complete without the electric railway.

Its promoters do not aspire to make a metropolis of Coral Gables. They are content that others shall strive for such honors. They have set out deliberately to make of it a model home community by imposing housing restrictions of the severest kind. As a means to this end of building up an ideal community—and an important means—they have installed an electric railway modern not only in respect to cars, but from track to its very trolley wire. The road makes its appeal to every member of the family. It is intended to be used by every member of the family. The dignity of the most presuming resident of Coral Gables will not suffer a jot in using the road. Not until every member of the family has an automobile will he be a free agent—a degree of the use of the auto that is not only inconceivable but physically impossible.

In the enthusiasm over the magnificence of the type of rolling stock to be used in that city the significance of the installation of the electric railway has not received, even among electric railway men, the attention it deserves. What a tribute that installation is to the essentiality of the trolley in community planning! Looked at rightly, it is one of the most potent arguments in behalf of the industry possible to conceive. Towns and cities elsewhere of modest and even of assuming proportions that are inclined to look down upon the electric railway will do well to ponder the lesson of Coral Gables.

Not every community has the possibilities for future growth that is inherent at Coral Gables; not many communities can hope to approximate it in civic consciousness and in salubrious surroundings. But there is not a community anywhere that can afford to ignore the significance of the value to it that Coral Gables has placed on the electric railway as a means of steady, dependable transportation.

New Cars and Better Service Attract Paying Traffic

A ROAD purchased from a receiver has been made to pay a good return because of the use of modern cars and the introduction of better service. Within a year, the reduction in operating expenses per car-mile was 27.3 per cent, and during the same period the operating expenses fell from 97.4 per cent to 77.7 per cent of the gross revenue. At the same time the average revenue per passenger increased 31.1 per cent, and every month, as compared with the corresponding month of the previous year, showed an increase in gross revenue and a decrease in operating expenses.

This is the record during 1925 of an interurban railway between Buffalo and Erie, which has to meet severe steam railroad competition and is in a region famous for its well-paved highways.

The reasons for the success of this interurban road may be summed up briefly. They were to provide comfort and speed in travel with economical operation. To supply the latter, light one-man cars were adopted. To furnish the former, the new cars were equipped with high-speed motors, modern trucks, as comfortable seats as the most luxurious automobile, and other equipment adapted to attract the through rider. The result is that the private automobile cannot compete in time or in comfort with the electric car, any more than it can on the cost of the ride.

Some people have affected to believe that the general use of the private automobile has seriously narrowed the field of the interurban car. If this is true it must be because the automobile can provide in greater measure than the car most of the objects sought by the passenger other than cost, because the cost to the passenger of riding by automobile is considerably more than that by trolley car. If these points of superiority of the automobile are analyzed, they will be found usually to be speed and luxury of travel. If the trolley car can be made superior to the private automobile in these two matters, it should win much of the business now carried by the latter.

Altogether, the history of the rehabilitation of the Buffalo & Erie Railway is a most encouraging one to owners of other interurban lines. The company claims that its service is "the last word in comfort, speed and safety" of travel, and this is the bid which it makes for patronage. That proper equipment and service which meets the modern transportation demand will win success for the interurban is emphatically demonstrated by the experience, which has been cited, of the Buffalo & Erie Railway.

Selling Rides to the Public of Atlanta

MAKE them want to ride! This is what the Georgia Railway & Power Company, Atlanta, is doing in a series of appeals that it is making to the public. So much is this so that the company was recently aided and abetted in its work by none other than Fuzzy Woodruff. This is indeed an achievement. Fuzzy is a local newspaper man with a roving commission. Office hours and time clocks mean nothing to him. His is a job in newspaper work that many covet but few achieve. Fuzzy is in the class with Bugs Baer, Moulton, O'Hara and others. It is a charmed circle. These rare spirits touch what they write with art. Their product stands out resplendent like Mars at perihelion. If you appear to them to be a subject for copy they turn their attention to you. It is up to you to be on your guard. They down dignity with a single sentence—where dignity and humbug travel under the same hat.

Well, Fuzzy, beguiled by the railway's appeal, turned his attention recently to the new Atlanta double-deck buses. Fuzzy forgot himself. He rode and rode and rode. Sam Weller and Pickwick in the spirit were with Fuzzy on this ride. And when he got home to a cold supper he found his wife had been doing the same thing—riding the top of one of the new buses. Both had fallen before the spell of the appeal of the signs in the street cars that proclaimed the complete glory of a red and golden autumn to be seen in Ansley Park atop of one of the new buses. It was a great afternoon for Fuzzy. But it was a greater one for the Georgia Railway &

Power Company, for Fuzzy put his experiences into print. It is the rage in Atlanta to read Fuzzy. For the benefit of those who may have missed the article in the original the railway reprinted Fuzzy's story in *Two Bells*. Not everybody runs double-deck buses that are sightseers. Not every city harbors a Woodruff. It was a deft hand that induced Fuzzy to ride. And it was, indeed, a deft hand that recorded the experience. A deft hand can always be counted upon to attribute strange attractions to the more or less commonplace and invest it with a necromancy that will live with it for a long time. It's the way it's done that counts.

Kansas City About Ready for a New Start

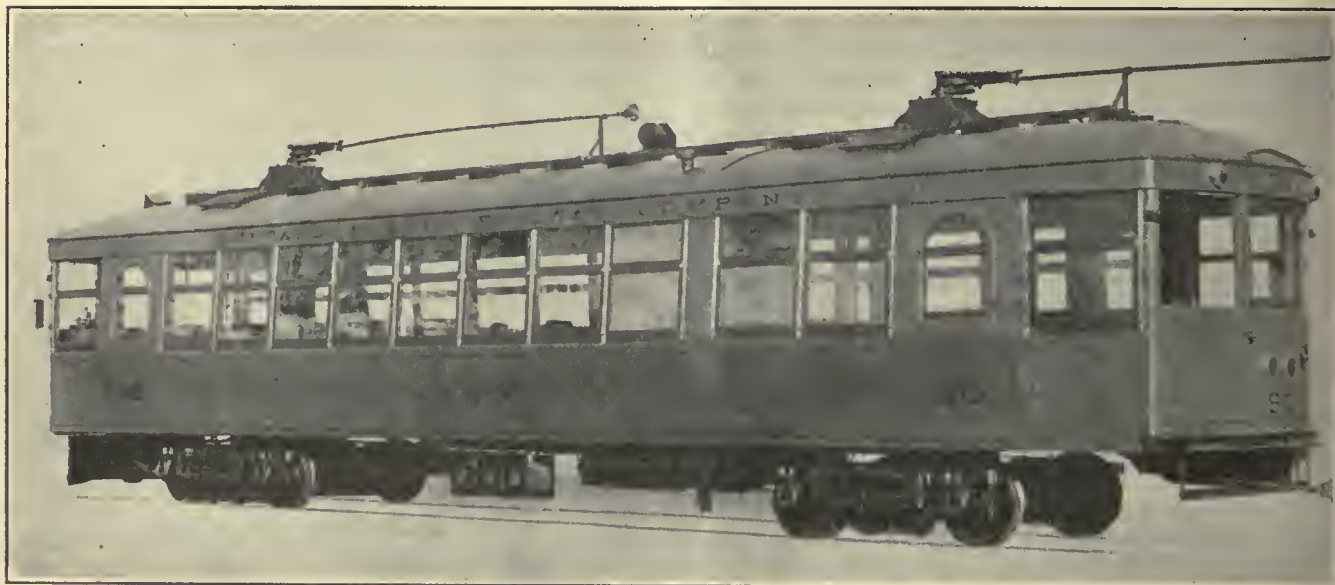
PROSPECTS appear to be good for lifting the receivership of the Kansas City Railways. On Jan. 4, under foreclosure, the properties passed to representatives of the holders of the first mortgage bonds. All other holders are eliminated unless the first mortgage holders agree to extend some measure of recognition to them or the courts rule that there are valid reasons for recognizing their contentions. There are some rumblings in behalf of these last-mentioned holders, to be aired publicly, it is expected, when the sale comes up for confirmation. Certainly the reorganization is drastic so far as it relates to the changes brought about in the capital structure. As a result fixed charges are pruned from \$2,057,600 to \$747,912. Net earnings during the receivership have been \$1,814,178 in 1921; \$2,135,858 in 1922; \$2,203,353 in 1923; \$1,730,475 in 1924 and were \$1,336,816 for nine months of 1925.

Interest here, however, is neither with the technical question of the respective rights of the different holders nor with the details of the basis of the security exchange, a matter treated in the JOURNAL for June 6, 1925. It is with the prospects for the future. They appear to be very bright. Not only has the property been well maintained, but a cash fund of about \$4,000,000 has been accumulated. This, it is said, will be used for extensions and improvements, presumably to be made under the direction of the personnel that has done so well with the property since the receivership on Sept. 9, 1920. That this management has kept up to date is exemplified by the extent to which it has co-ordinated bus operation with the railway with 10-cent fares on local bus routes and 25-cent fares on express routes. This was an accomplishment difficult to achieve with the property in the hands of the court, but it was achieved, and it presages well for the future. As for the franchise terms under which the company operates, they are, perhaps, not ideal in every respect, but the grant was made in 1914 and runs to 1944 with operation under modified service at cost.

F. G. Buffe, manager for the receivers, is a keen observer of events. He has publicly said that "the American people are spoiled darlings of invention and civilization," but he has also said that "we have until recently been trying to sell transportation in old run-down cars to critical, exacting people, and the result has been that many of our customers have left us." All of his acts reflect as his sentiment, and the sentiment of the organization of which he is a part, the modern doctrine "get the gross up and then take care of it."

Attractive Cars Put Buffalo & Erie Railway on Paying Basis

This Road, Which Was a Losing Venture for Sixteen Years, Is Rapidly Recovering with the Aid of Light-Weight, One-Man, High-Speed Cars Designed to Attract Passengers and Reduce Operating Costs



The Car That Caused the Change

WHILE today the Buffalo & Erie Railway is well on the road to an attractive earning basis, approximately a year ago this 92-mile interurban line running interstate between the terminal cities from which it takes its name was purchased out of bankruptcy. From the day the line was completed in 1909 it was a losing venture and for nine years previous to the recent purchase it had been in the hands of a receiver. Several times during this period the property was close to total abandonment due to failure to earn actual operating expenses.

The methods by which the new management has brought this property from such a hopeless outlook to a position that has built up a spirit of aggressive optimism in its employees and enthusiastic commendation on the part of the communities served make an inspiring record. That this has been accomplished in less than a year makes the situation even more interesting and significant to the entire industry.

The results accomplished are attributed by the management largely to the acquisition of light-weight cars designed carefully in every detail from the standpoint of rendering the utmost in service and attraction to passengers, while at the same time making possible very substantial reductions in operating costs. With this equipment, in the hands of a management alive to the necessity of building traffic by modern merchandising methods, the income of the property has been increased in the face of a severe commercial and industrial depression locally. At the same time, a large reduction in operating expenses has left a net revenue that bids fair to increase steadily.

Light-weight one-man interurban equipment has more than demonstrated its practicability and safety on a comparatively long run under severe competitive conditions. Two high-grade steam railroads, one of which is the main line of the New York Central, run between the terminal cities. In addition, a paved highway offers an attractive route for automotive vehicles. But the new cars, described in detail in the Aug. 8 issue of ELECTRIC RAILWAY JOURNAL, were designed with such careful attention to meeting these requirements that

TABLE I—COMPARATIVE OPERATING STATISTICS, BUFFALO & ERIE RAILWAY

For ten months ended Oct. 31, 1925, under new one-man cars versus corresponding period last year with old two-man operation

Service	Per Cent Increase or Decrease (D)
Car-miles.....	16.7
Car-hours.....	6.5
Speed in miles per hour.....	9.2
Passengers carried.....	14.7 (D)
Seat-miles.....	33.4
Receipts per passenger.....	31.1

PER CENT OF GROSS REVENUE

	Ten Months 1925	Ten Months 1924	Decrease	Per Cent Decrease
Operating Expenses				
Maintenance.....	13.6	21.2	7.6	35.8
Power.....	8.8	12.8	4.0	31.3
Conducting transportation.....	28.8	36.2	7.4	20.4
Other operating expense.....	26.5	27.2	0.7	2.6
Total operating expense.....	77.7	97.4	19.7	20.2

PASSENGER REVENUE AND COST PER CAR-MILE

Revenue, cents per car-mile.....	34.0	36.5	2.5	6.8
Expense, cents per car-mile.....	28.1	38.7	10.6	27.3
Revenue per passenger, cents.....	37.9	28.9	9.0*	31.1*

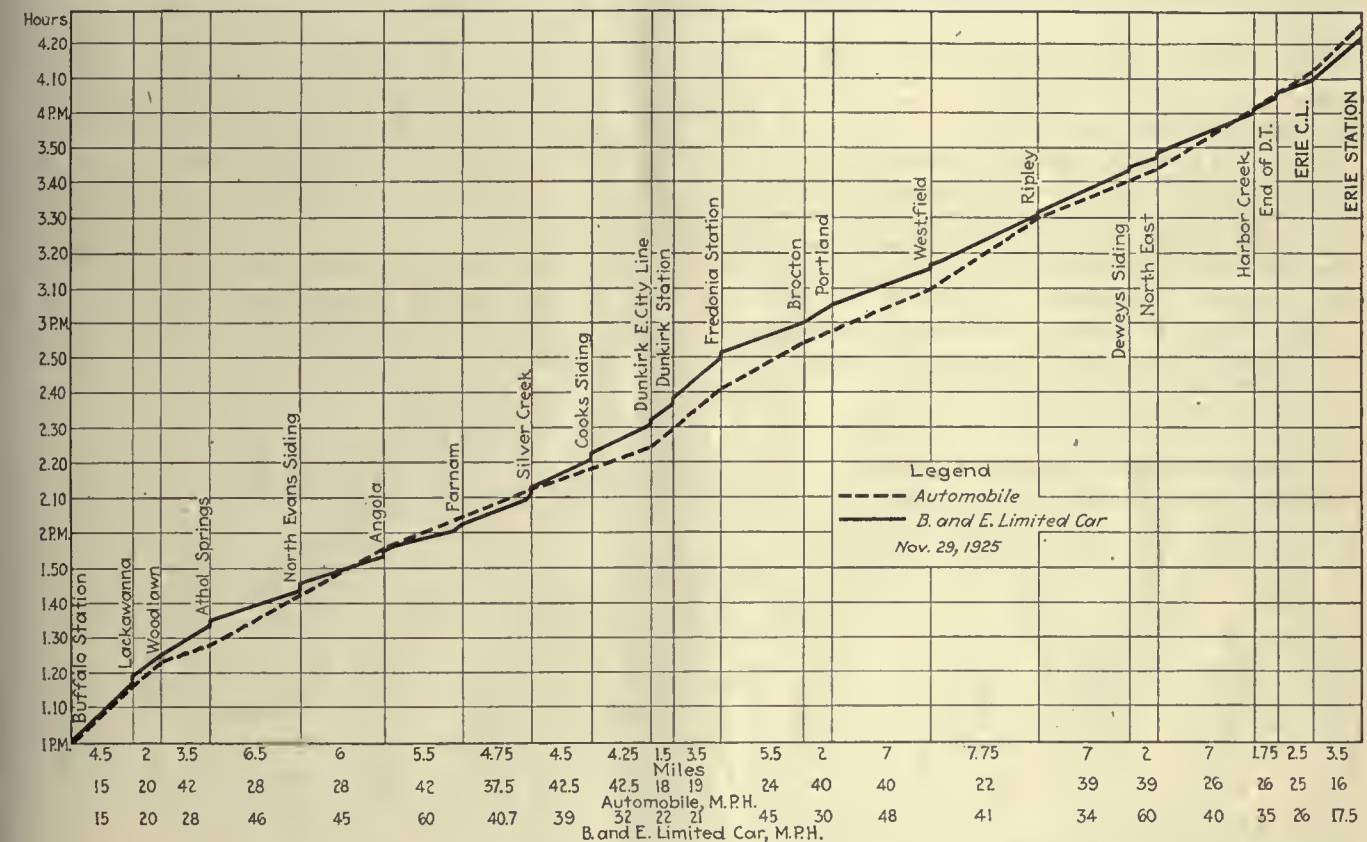
*Increase.

profitable performance seems assured despite the unusually severe conditions encountered.

When the International Utilities Corporation, owner of this property under the direction of the Chandler Management Corporation, installed the new cars less than a year ago, the road quickly began to take on new life. The new owner in the rehabilitation of the Kentucky Traction & Terminal Company at Lexington, Ky., had previously demonstrated the efficacy of light-weight one-man interurban cars in fighting rising operating costs and automotive competition. When the Buffalo & Erie property was acquired, it was decided that the type of equipment operated was the key to both increased patronage and reduced cost.

With a management alert to the comfort and convenience of the traveling public, the confidence of the communities along the line was won by outright frankness and performance. At first, an antagonistic attitude by the employees and dubiousness on the part of the public was encountered. After less than a year of

results, the general industrial and business conditions in the territory served should be taken into consideration. Starting about the time the new cars were put in service, the entire region experienced one of the most severe business depressions in its history. A large volume of regular industrial travel was temporarily lost due to the shutting down of industrial plants on the line. The gains shown in Table I represent, therefore, transient business and former automobile riders that have been attracted by the new service. This statement is borne out by the statement that although the total number of passengers carried has decreased 14.7 per cent for a ten-month period in comparison with 1924, there is a much larger proportion of through riding because of the improved service. As a result, the average receipts per passenger have increased for the ten months of 1925, in comparison with the corresponding period of the previous year, by 31.1 per cent. The better service is also shown by the greater increase of car-miles than of car-hours.



Speed Time Curve of a Limited Electric Car and of a Private Automobile Between Buffalo and Erie

The automobile, a six-cylinder Buick, made a no-stop run between the terminal and was driven at as high a speed as possible consistent with safety and the speed laws. The trolley car made eighteen city and village stops and carried a total of 82 passengers, yet made the run in four minutes less time than the automobile and in its regular schedule time. Where service like this is given by an electric railway, there is not much danger of competition by automobiles or buses.

operation with the new equipment, this condition has been reversed. The results accomplished are clearly shown by some of the operating results.

STATISTICS TELL THE STORY

Up to Dec. 31, 1924, the road was being operated with the old, heavy two-man cars. In October, 1925, the new equipment had been in service for ten months. The comparisons in Tables I and II are between the ten months of operation ended Oct. 31, 1925, with the new equipment, and the corresponding ten months of 1924, when the old cars were still in service.

When these figures are considered in analyzing the

While the growth in revenue was obtained under the adverse business conditions mentioned, operating costs were at the same time sharply reduced. Comparing the ten months of 1925 with the similar period of 1924 maintenance expense was reduced from 21.2 per cent of gross revenue to 13.6 per cent of gross revenue, or a reduction of 7.6 per cent of the gross. Power expense was reduced from 12.8 per cent to 8.8 per cent of gross revenue, or a reduction of 4 per cent of gross revenue. Expense of conducting transportation was reduced from 36.2 per cent to 28.8 per cent of gross revenue, or 7.4 per cent less. Total operating expense was reduced 19.7 per cent of gross revenue. The significance of this



The Buffalo & Erie Railway Has Built Up a Profitable Business by Giving High-Speed Service Between Buffalo & Erie with Modern Light-Weight One-Man Cars. This View Shows a Bridge Over Cattaraugus Creek at Irving, N. Y.

result is readily apparent when it is noted that the 19.7 per cent reduction for the ten-month period brought operating expenses down from 97.4 per cent of gross revenue to 77.7 per cent.

The actual operating figures are given in Table II.

Out of a total of eighteen cars operated, six limited cars take in 38 per cent of the gross passenger receipts. The actual average revenue per car-mile for the ten months of 1925 was 34 cents as compared with 36.5 cents in 1924. The expense per car-mile was 28.1 cents in 1925 and 38.7 cents for the same period the previous year. The average energy consumption for the limited cars during October, 1925, was 1.96 kw.-hr. per car-mile. For the local cars it was 2.25 kw.-hr. per car-mile.

All this has been accomplished despite the substantial improvement in service that is also shown by the

figures. Comparing the ten months of 1925, car-miles were increased 16.7 per cent, schedule speed 9.2 per cent, and seat-miles 33.4 per cent. In all the comparisons for the ten-month period, it must be remembered that operation of the new equipment did not get into full swing for 30 to 60 days after it was first put in service.

LINE NOT PROFITABLE WITH HEAVY EQUIPMENT

To visualize what the improvement in equipment and methods have accomplished, a brief history of the property is interesting. Although various short sections of line had been operated for some years between Fredonia and Erie, the entire road was not completed until the section from Buffalo to Fredonia was built in 1909. From the very first, the enterprise was unprofitable and for about two years hourly service was maintained at

TABLE II—OPERATING STATISTICS, COMBINED PASSENGER AND FREIGHT DEPARTMENTS, BUFFALO & ERIE RAILWAY
For ten months ended Oct. 31, 1925, under new one-man cars versus corresponding period last year with old two-man operation

	Gross Revenue				Operating Expenses and Taxes				Net Income	
	1925	1924	Increase	Per Cent	1925	1924	Decrease	Per Cent	1925	1924
January.....	\$58,728.70	\$55,512.54	\$3,216.16	6.3	\$49,546.12	\$55,568.21	\$6,022.09	10.8	\$9,182.58	\$55.67*
February.....	36,661.30	55,259.96	1,401.34	3.6	45,915.43	52,346.43	6,431.00	12.2	10,745.87	2,913.53
March.....	57,272.36	56,985.83	286.53	.5	48,977.14	53,655.36	4,678.22	8.7	8,295.22	3,330.47
April.....	56,676.18	52,337.15	4,339.03	8.8	44,563.32	49,883.82	5,320.50	10.6	12,112.86	2,453.33
May.....	58,076.68	53,734.63	4,342.05	8.6	45,652.54	52,122.39	6,469.85	12.4	12,424.14	1,612.24
June.....	55,616.34	49,690.75	5,925.59	12.5	43,741.14	56,288.23	12,547.09	22.2	11,875.20	6,597.48
July.....	61,638.19	56,348.06	5,290.13	9.9	44,613.07	53,852.28	9,239.21	17.1	17,025.12	2,495.78
August.....	66,605.21	61,995.28	4,609.93	7.9	47,070.89	54,144.46	7,073.57	13.0	19,534.32	7,850.82
September.....	59,498.60	51,432.83	8,065.77	16.2	44,683.92	49,814.02	5,130.10	10.2	14,814.68	1,618.81
October.....	53,604.65	50,464.50	3,140.15	6.2	38,590.22	51,750.44	13,160.22	25.4	15,014.43	1,285.94*
	\$584,378.21	\$543,761.53	\$40,616.68	7.5	\$453,353.79	\$529,425.64	\$76,071.85	14.4	\$131,024.42	\$14,335.89

* Deficit.



Here Are Two Substantial Way Stations Along the Line of Route, One at Silver Creek, the Other at Westfield. Both Have Accommodations for Freight as Well as Passengers

a loss. The equipment consisted of cars weighing 40 tons, four to six years old, that had been in service on the section from Fredonia to Erie. In 1909 eight double-truck cars, weighing approximately 38 tons and seating 56 passengers, were purchased. Two additional lots of cars, totaling nine, were added by 1913. These were all comparatively heavy two-man cars. It was found that the multiple-unit control with which the cars were equipped was not suited to the frequent stop service between Fredonia and Erie. Consequently, the old cars were kept on the division west of Fredonia and the new equipment was operated between that point and Buffalo. Through passengers were required to make a transfer.

Upon completion of the line east of Fredonia, the distance from Buffalo to Erie was 92.5 miles. The scheduled time was four hours and 40 minutes. On the division west of Fredonia there were 173 stops in a distance of 46 miles. Between Fredonia and Buffalo there were 47 stops in an equal distance. Of the total line between Buffalo and Erie, approximately 82.5 miles is single track and 10 miles is double track. Approximately 16 miles of the line is in paved streets. Under the old operating conditions, one limited run was made each morning between Erie and Buffalo without a transfer at Fredonia. This was made in three hours and fifteen minutes, with a total of twelve stops.

The line continued unprofitable, and on Aug. 7, 1915, became insolvent. Receiver's certificates were issued from time to time to make improvements and to maintain service. Seven new 33-ton steel cars, seating 63 passengers, were purchased, and seven of the old cars built earlier than 1909 were retired. Expenditures for other physical improvements and even for operating expenses were held to a minimum. With the advent of the automobile, however, the road barely held its former volume of traffic. Most of this consisted of local necessity riding. There was little through traffic between Buffalo and Erie, and in fact few passengers for distances above 30 miles.

As the use of automobiles increased, the road seemed doomed. This was the condition when Chandler Management Corporation, assured by its experience with light-weight equipment on the lines in Lexington of the Kentucky Traction & Terminal Company, decided that the line could be made to pay and purchased it. The corporation immediately ordered fourteen new light-weight interurban cars from the Cincinnati Car Company, designed for high speed and one-man operation. Four single-truck Lexington safety cars and two snow plows were also added. The entire passenger operation was put on a one-man basis.

NEW CARS AND BETTER SERVICE DO THE TRICK

From the very beginning, the new management was convinced that a high average speed was essential to winning the volume of riding that would make the road profitable. At the same time, the comparatively long run required a car which would appeal to passengers from the standpoint of comfort and ease of riding. Every detail of the new cars was carefully worked out with these two objectives in mind. Attention was directed to making the cars pleasing in appearance both inside and outside. Exposed equipment on the interior was eliminated as far as possible. An effort was also made to minimize noise. Seat design was carefully studied and the cars were finally equipped with a combination of individual chairs and plush upholstered cross-seats



Although One-Man Operation Is Used, These 58 Passengers Were Loaded and Fares Collected from Those Without Tickets in One Minute 23 Seconds

in which many details that would afford comfort and relaxation to passengers were included.

It was decided that the degree of passenger comfort is due to a combination of many items, which, although apparently of minor importance in themselves, all go to affect the senses of touch, sight or hearing in either a pleasing or displeasing way, depending on the care with which the complete car is worked out. An unobstructed view is provided at the front end by setting plate glass directly into the vestibule posts without sash. At the same time a similar arrangement at the rear end of the car makes an observation compartment of the smoking room. Gutters have been installed along the eaves at the sides of the roof to keep water from dripping down on the side windows. Cork side lining, salamander roof and double floors have been used to deaden noises and drumming in the interior. The smoking compartment, already mentioned, is fitted with seats as comfortable and upholstered with the same material as those in the main compartment. The heaters in this smoking compartment are under separate thermostatic control from those in the main compartment, so that in winter either can be kept at a comfortable temperature irrespective of the other.

Buffalo & Erie Railway

Limited Service
every 2 hours
on the odd hour

Local Service
every 2 hours
on the even hour

\$3.65 Round Trip
TO ERIE
3 HRS & 10 MIN

50 CLINTON ST.
AT ELLICOTT

ANGOLA • SILVER CREEK
DUNKIRK • FREDONIA
WESTFIELD • CHAUTAUQUA LAKE
JAMESTOWN • NORTHEAST

The Buffalo & Erie Railway Uses Electric Signs at the Terminal Closes to Advertise Its Service. This Sign Is in the Heart of the Business District in Buffalo and Measures Approximately 20 Ft. x 30 Ft. Two Similar Signs Are at Erie

A special type of high-speed truck, designed and built by the Cincinnati Car Company, gives the new equipment a riding ease at high speed over only fair track superior to that obtained on many cars of much greater weight operating on heavier and better track.

The new cars have a free running speed of 56 m.p.h. To maintain a high schedule speed, unnecessary stops and delays were eliminated and the time of meeting stops and calls to the dispatcher was cut to a minimum. All stub end passing sidings for use by regular trains have been eliminated. With this end in view, Nachod block signals were installed over the entire line. The schedule speed was raised to 29 m.p.h. between terminals. This includes the running time inside the cities of Erie and Buffalo, as well as the smaller cities along the line. The average speed outside the limits of the terminal cities is 36 m.p.h. Limited service is given every two hours in each direction between 7 a.m. and 5 p.m. Local cars are operated between the limits, so as to give a car in each direction every hour. Night trains run on local schedule after 5 p.m. and up to 11 p.m. Total time between terminals is three hours and twenty minutes for limited cars and three hours and 35 minutes for locals.

CAR SERVICE FASTER THAN THAT BY AUTO

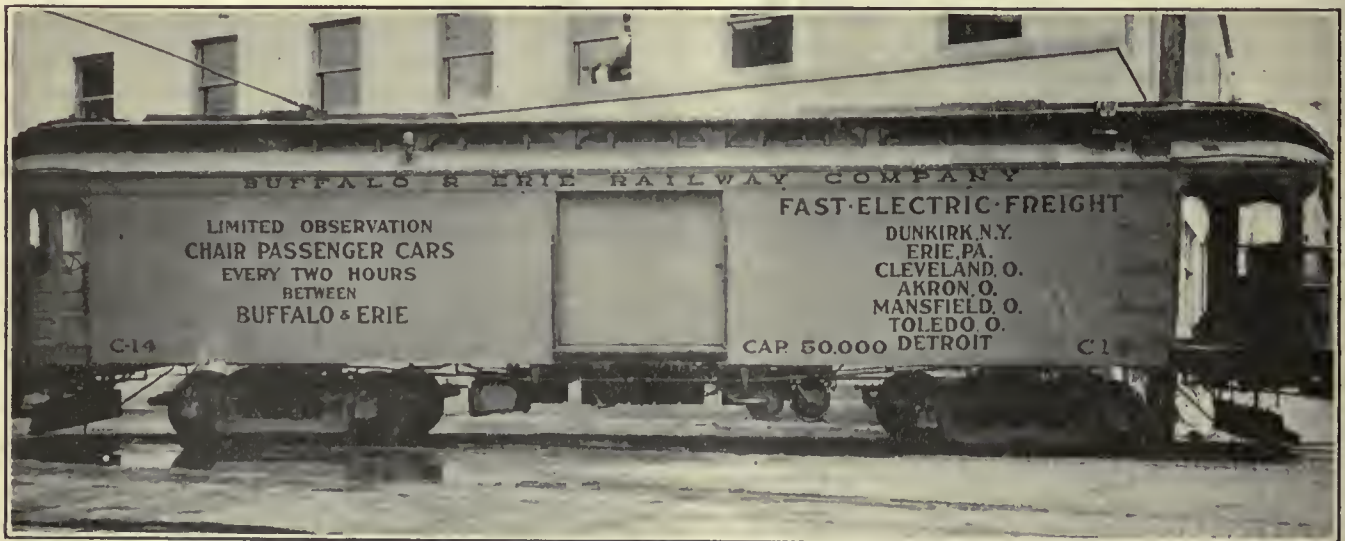
The time made by the limited cars is just as good or better than that which could be made by an individual non-stop automobile. It was realized that such speed was necessary to compete with the private cars, in view of the excellent highways which practically parallel the route.

A comparison between the two services is given by

than would be possible in the summer when the roads were congested or even with a normally clear road, if stops were made to pick up passengers as would be the case with a bus.

The run of the limited car shown on the chart was made in the schedule time of three hours and twenty minutes or four minutes less than the automobile. It was not a non-stop run, like that of the automobile, but included eighteen city and village stops for passengers. The number of passengers carried on the run was 82. The railway run might have been made in considerably less time, but it is scheduled with some leeway, so that the car can make the schedule daily with whatever passenger traffic it may have and regardless of normal weather conditions. Thus, on Nov. 25 last, the day before Thanksgiving, with twenty trains out of Buffalo and an average of approximately 30 passengers per train, and a large amount of local traffic, all the cars were practically on time.

As shown by the speed time chart, the time of loading and unloading is not great, although only one operator is used per car. One of the accompanying engravings shows a group of waiting passengers taken at 4:05 p.m., Oct. 29, in Fredonia, when 58 passengers boarded the westbound car, yet from the time when the door was opened until the last passenger was on the car and the door closed was one minute and 23 seconds, with all fares collected. Of course, after a passenger is on the car and has paid his fare, he is not disturbed by a conductor coming through the car collecting fares. Having the passenger leave and board the car under the direct observation of the operator saves time over the practice of having the starting



Each Freight Car Carries a Slogan to Advertise the Service

the speed-time run shown in the chart on page 59, in which the solid line shows the run of a limited car of the Buffalo & Erie Railway and the dotted line a non-stop run from Buffalo to Erie by a large six-cylinder Buick automobile driven as fast as safety and the speed laws of the villages would permit. The day was bright, clear and crisp, well adapted to the making of high speed by the automobile, and it was driven at a period of the day when highway traffic was the lightest. At times it ran as high as 50 m.p.h. and generally between villages an average speed of 42½ m.p.h. was attained. The result was that the run was made in three hours and 24 minutes, a time which is very much shorter, of course,

signal given by a conductor who may be in the center of the car collecting fares. That this principle, well known in city service, has proved to be equally true in interurban service is worth accentuating. It should be said, however, in connection with the speed of loading, that on the Buffalo & Erie Railway the fares paid by ticket average 67.1 per cent of the total fares collected.

PUBLIC SUPPORT GAINED

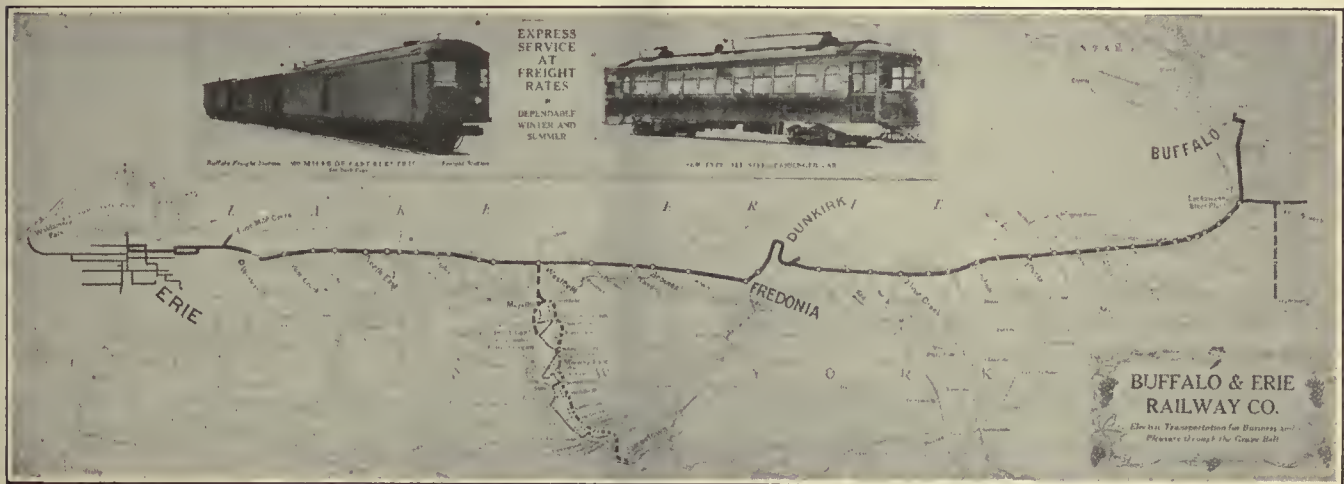
As the railway had been run with a crew of two men per car for a long time, the suggestion that one-man operation be employed caused some opposition at first, both on the part of the employees and the

public. This was quickly overcome, however, by actually demonstrated performance and by the many attractive features of the cars. The safety of one-man operation was likewise demonstrated to the satisfaction of both employees and passengers. Support of the public was won in meetings of the Chambers of Commerce and other civic bodies in the communities along the line. The purposes and objects of the new management were carefully and frankly outlined. It was clearly shown that this in the last analysis would lead to improved service.

An advertising and traffic building campaign was started. Billboards, local newspapers, circulars, fold-

and good for 45 days are sold at the rate of 1.8 cents per mile. Special school tickets are sold on a basis that is less than 1 cent per mile.

Both tickets and cash fares are collected by the operator of the car without difficulty. The McDonald duplex system is used for cash fares. A passenger entering the car with a ticket presents it to the operator, who immediately cancels the ticket by punching it. Upon leaving the car, the passenger surrenders this ticket to the operator, who can at a glance see if the passenger has ridden beyond the station shown on the ticket. A cash fare passenger, when boarding, secures from the operator a duplex receipt, which is returned



This Map Shows the Route of the Buffalo & Erie Railway, with Electric Railway Connections and Parallel Steam Railroads. The Buffalo & Erie Railway is Shown by the Heavy Solid Line

ers, blotters and car cards were employed. A large flashing electric sign is maintained in Buffalo in the heart of the business district on Main Street across from Lafayette Square. The sign is approximately 20 ft. x 30 ft. and is visible for a considerable distance at night. A reproduction of this sign is shown on page 61. Two very similar signs, but 27x34 ft., are carried in Erie. All three signs have a running border of 10-watt green lights. The arrow is made up of 15-watt green lights, with ten-second flashes, and the large white lamp in the center is 250 watts. In addition, the sign is illuminated with large goosenecks hanging over the top, with floodlights below the bottom of the sign. The signs have a white background. Where the lettering shows black in the engraving, the letters are really red, the lighter letters being dark blue. The chair is an olive green, and the girl wears a yellow dress with a white collar, white hat and white gloves.

The effort to back up these claims of speed, comfort, convenience and necessity with performance, as declared by the signs and other advertisements of the company, has met with general recognition by the public and press in the territory served. Many favorable notices have appeared in the papers on the transformation in the line.

FARES AND FARE COLLECTION

The base fare for a single ride is at the rate of 3.6 cents per mile. Special excursion tickets are sold for feature events on a 2.5 cents per mile basis. Excursion round trip tickets to the terminal cities at either end are sold from any agency station at the rate of 2 cents per mile. Commutation books containing 54 rides

to him on leaving the car. The operator can see if the passenger has ridden beyond the station punched on the duplex receipt.

The operator makes out one daily trip report for each day's service, which gives the following information:

- Number of trips made, whether on local or limited trains.
- Station from and to which the operator is running.
- Time of running.
- Number of duplex tickets issued on each trip.
- Number of kilowatt-hours consumed on each trip.
- Number of hours worked each day.

At the end of each trip, the operator places in an envelope all of his duplex stubs, duplex tickets, and receipts collected.

The stubs and the duplex tickets are audited to determine if the operator has turned in the amount of cash as shown by his trip report and as certified by the station receiver. The number of fares collected between different points is determined by an audit of the tickets and duplex stubs as taken from the operator's envelope.

FREIGHT SERVICE

Besides the passenger service, the Buffalo & Erie Railway has developed quite an electric freight service. On Nov. 1, 1925, through traffic arrangements were made with the Cleveland, Zanesville & Eastern Railroad, by which its freight service is extended west of Erie to Conneaut, Ashtabula and Cleveland. The connection between Erie and Ashtabula is by means of a trucking service operated by the Buffalo & Erie Coach Corporation. The joint tariff issued by the two railways and this trucking corporation is on a strictly steam railroad basis, with shipments as fast if not

faster than by railway express. Shipments delivered to the Buffalo & Erie Railway as late as 5 o'clock in the afternoon are delivered in Cleveland by noon the following day.

By still later tariffs, the company has just completed arrangements by which it can handle freight from Buffalo and other points on the line to Akron and other stations on the Northern Ohio Traction & Light Company line as well as to points on the Cleveland Southwest Railroad and Lake Shore Electric Railway out of Cleveland. The company hopes by January to extend this service still further to reach points in Michigan, Indiana and as far south as Cincinnati and Louisville, and it has become a party to the tariff of the Electric Package Agency. The company also expects to take through shipments east as far as Oswego, Syracuse, Utica, Rochester and Buffalo and hopes to be able to guarantee considerably more rapid delivery than the steam railroad for this service.

The view shown of one of the freight cars of the company illustrates the practice of the company in carrying a slogan to advertise its passenger service as well as its freight service. The passenger service slogan on this car reads: "Limited observation chair passenger cars every two hours between Buffalo and Erie." Other freight cars carry different slogans.

Statistics of the Industry

Table Just Compiled Shows Number of Companies, Miles of Track and Types of Cars Used in the United States

PUBLICATION annually of a table showing the miles of track and number of cars operated by the electric railway companies of the United States has been a feature of the statistical work undertaken by this paper almost since its establishment in 1884. These statistics are obtained each year from the data received for the McGraw Electric Railway Directory, which is now published annually in February. A table of this kind, based on the February, 1925, issue of the directory, was published in the issue of this paper for March 7, 1925.

This year it was decided, as many of the reports for the 1926 directory have been received, to compile and publish this table as early in January as possible, and it is printed herewith. All of the advance reports for the 1926 directory received during the past month have been used in its compilation, as well as reports sent in for the 1925 directory but received too late to be included in it. Where the figures on individual railways were still missing, the figures which appeared in the February, 1925, directory have been employed. Altogether about 40 per cent of the reports used to make up the accompanying table are new and 60 per cent were taken from the 1925 directory.

The method of compiling the figures which has been used in past years has been continued this year. The following is a brief statement of them. The mileage and cars of an interstate road have been placed in the state containing the greatest mileage of that company. The table includes the mileage and cars used on electrified sections of steam railroads, as well as on city and interurban electric railways. Cable railway cars, of which there are a few left in cities in the Pacific States, have been included under "Passenger Trail Cars."

On roads operating by both steam and electricity an

NUMBER OF ELECTRIC RAILWAY COMPANIES, MILES OF TRACK AND NUMBER OF CARS OF VARIOUS TYPES OWNED BY ELECTRIC RAILWAY COMPANIES IN 1925

	No. of Cos. Operating	Miles of Single Track	Passenger Motor Cars	Passenger Trail Cars	Electric Locomotives	Freight Motor	Freight Trailers	Service Cars	Other Cars	Total All Cars
New England States										
Connecticut...	9	1,574.27	1,606	68	120	61	12	259	1	2,127
Maine.....	14	511.62	384	8	6	31	76	122	24	651
Massachusetts	28	2,571.06	5,008	252	10	95	12	887	73	6,337
New Hampshire	12	258.63	324	2	2	5	1	50	9	393
Rhode Island	4	381.20	1,044	26	3	35	...	165	...	1,273
Vermont.....	6	113.72	89	...	5	3	3	9	3	112
1925 total...	73	5,410.50	8,455	356	146	230	104	1,492	110	10,893
1924 total...	72	5,518.05	8,621	419	136	258	124	1,485	122	11,165
Eastern States										
Delaware.....	1	139.73	191	72	...	3	...	30	...	296
D. of Col.....	6	388.50	929	85	8	5	22	123	...	1,172
Maryland....	9	687.68	1,967	164	13	22	74	11	14	2,265
New Jersey...	21	1,434.17	2,923	108	2	7	10	323	23	3,396
New York....	86	5,428.19	16,697	1,614	132	111	103	1,546	537	20,740
Pennsylvania	96	4,591.65	7,651	497	6	178	98	1,066	122	9,618
Virginia.....	13	447.21	863	63	3	17	32	60	1	1,039
W. Virginia...	14	696.72	398	9	19	19	30	37	4	516
1925 total...	246	13,813.85	31,619	2,612	183	362	369	3,196	701	39,042
1924 total...	252	13,736.76	32,180	2,603	174	342	373	3,364	708	39,744
Central States										
Illinois.....	40	3,553.55	6,342	870	63	343	1,082	704	18	9,420
Indiana.....	28	2,485.45	1,783	269	9	57	662	120	367	3,267
Iowa.....	22	957.79	716	111	36	20	378	153	8	1,422
Kentucky....	6	485.85	765	62	...	15	10	143	8	1,003
Michigan....	22	1,794.91	2,817	338	23	133	170	300	274	4,055
Minnesota...	10	707.11	1,212	10	4	2	2	104	2	1,338
Missouri....	19	1,145.02	2,568	265	4	21	27	344	22	3,251
Ohio.....	59	3,826.97	4,140	579	33	241	456	462	364	6,275
Wisconsin...	18	801.22	1,163	74	8	38	30	241	4	1,558
1925 total...	224	15,757.85	21,506	2,578	180	872	2,817	2,571	1,065	31,589
1924 total...	228	15,787.40	21,462	2,555	186	839	2,725	2,564	1,087	31,418
Southern States										
Alabama.....	8	384.09	467	80	2	10	34	104	15	712
Arkansas....	8	125.32	223	19	...	1	4	17	3	267
Florida.....	7	196.61	353	11	...	12	5	26	...	407
Georgia.....	10	459.95	688	32	1	4	10	13	46	794
Louisiana...	9	315.55	826	45	...	3	...	82	2	958
Mississippi...	7	94.08	106	20	...	5	1	5	2	139
N. Carolina...	8	355.09	295	22	17	6	161	25	8	534
S. Carolina...	4	126.18	126	9	...	1	...	6	12	154
Tennessee...	9	417.43	669	80	1	5	2	65	5	827
1925 total...	70	2,474.30	3,753	318	21	47	217	343	93	4,792
1924 total...	72	2,524.33	3,816	328	22	51	227	340	95	4,879
Western States										
Arizona.....	3	43.79	48	...	...	...	...	3	...	51
California...	33	3,408.80	4,247	310	90	104	3,653	660	63	9,127
Colorado....	10	392.25	392	138	8	7	185	122	6	858
Idaho.....	2	88.70	32	...	3	...	21	3	...	59
Kansas.....	13	517.29	360	26	3	46	113	43	...	591
Montana....	7	845.19	112	26	89	7	2	12	...	248
Nebraska....	5	250.96	605	10	3	4	...	93	...	715
Nevada.....	1	7.5	5	...	...	...	...	...	...	5
New Mexico...	2	10.95	16	...	...	...	...	...	...	16
N. Dakota...	4	25.79	40	22	...	...	...	22	34	71
Oklahoma...	13	370.66	289	16	9	6	187	22	34	563
Oregon.....	9	754.39	700	93	19	...	506	194	58	1,570
S. Dakota...	2	19.75	27	...	...	2	2	3	...	34
Texas.....	22	1,017.83	1,404	95	1	19	12	137	25	1,693
Utah.....	5	483.09	217	45	21	7	240	13	211	754
Washington...	14	1,040.25	1,063	92	33	47	710	88	...	2,033
Wyoming....	1	16.50	8	...	...	...	...	...	4	12
1925 total...	146	9,293.69	9,565	873	279	249	5,631	1,402	401	18,400
1924 total...	145	9,270.22	9,599	863	281	300	5,367	1,339	479	18,428
1925 total U.S.	759	46,750.19	74,898	6,737	809	1,760	9,138	9,004	2,370	104,716
1924 total U.S.	769	46,836.76	75,678	6,768	799	1,790	9,016	9,092	2,491	105,634

effort has been made to include in the table only that equipment used in electric railway service. In consequence, the trail freight cars of the Fort Dodge, Des Moines & Southern Railroad and the coal cars reported by the East St. Louis & Suburban Railway and the St. Louis & Belleville Electric Railway are not included. The 3,000 package cars of the Chicago Tunnel Company are also omitted.

Dr. W. B. Bizzell, president of the University of Oklahoma, wrote to R. C. Sharp, president, and E. F. McKay, manager, of the Oklahoma Utilities Association, recently, announcing a four-year course in the School of Business, to be entitled "Public Utility Administration," effective with the scholastic year 1926. This announcement follows correspondence and conferences between the university executives and officers of the Oklahoma Utilities Association covering a period of more than two years.

Photography an Aid to the Railways

**A Survey Covering 50 Representative Companies Shows Extensive Utilization of Photographs—
Claims Department Work, Publicity and Progress Records of Construction Are the
Principal Uses—A Majority of the Railways Have Private Photographers
—Advantages and Disadvantages of This Practice Are Discussed**

PHOTOGRAPHS taken by a group of 50 representative electric railways during the past year range in number from two to 4,000 per company. To record the situation existing at the time of an accident is the purpose for which most of these photographs are used, according to information submitted by the various companies in reply to letters of inquiry from *ELECTRIC RAILWAY JOURNAL*. Publicity work, safety work, progress records and personnel records are other common uses. A number of railways, however, have developed unusual and interesting applications of photography.

From the comparative numbers of pictures taken by the different companies during the past year it is apparent that some railways have developed the use of photographs to a much greater extent than others. The largest number taken by any company from which information was received was 4,000 by the Cleveland Railway. Next among those replying to the *JOURNAL*'S inquiry were the Philadelphia Rapid Transit Company, 3,500; the Third Avenue Railway of New York City,

3,000; the Kansas City Railways, 2,682; the United Railways of St. Louis, 1,971; the Market Street Railway of San Francisco, 1,555, and the North Shore Line and the Milwaukee Electric Railway & Light Company, with 1,000 each. Several of the medium-sized and smaller railways use a considerable number of photographs. Among these are the Omaha & Council Bluffs Street Railway, which took some 900 during the past year; the Dallas Railway, 300; the Nashville Power & Light Company, and the Grand Rapids Railway, 200 each; the Middlesex & Boston Street Railway and the Union Street Railway of New Bedford, 100 each.

More than half of the companies replying to the inquiry have photographers in their own employ. Quicker availability of a private photographer is an advantage mentioned by a number of companies. Work done by a company photographer is likely to be less expensive than that of an outside man, it is said. In the case of the smaller railways, however, there is not sufficient photographic work to require a man's



Enlarged View of Central Business District

A Small Scale Reproduction of a Mosaic Made from Many Airplane Views of Cleveland Taken Under the Direction of the Cleveland Railways. Recently a Site for a Large Development Was Selected Through the Use of This Remarkable Map, Thus Saving Days of Tedious Inspections and the Consequent Costs



full time, and many of these companies prefer to use a public photographer. Others have the work done by one of their regular employees, as do practically all the large companies.

The Mobile Light & Railroad Company states that it finds that its own photographer understands better than does a public photographer just what is wanted in the picture. The publicity director of the New Orleans Public Service, Inc., states that most public photographers either cannot or will not take dramatic pictures and for that reason he does most of the work himself.

Definite advantages in having photographic work done by an outside man are mentioned by several railways. For use as evidence in court in accident cases it is said that the pictures taken by a public photographer are more valuable than those taken by a company man. Thus many railways use both public and private photographers, depending on the purpose for which the pictures are being taken.

MANY PICTURES PORTRAY ACCIDENTS

Claims department work is the most general reason for taking photographs. The statement of the Middlesex & Boston Railway summarizes the general practice. "Pictures taken of the locus of accidents, the street car and the other vehicles which are in the accident have very frequent use and are extremely valuable in many cases. This is especially true of automobile cases, where question arises about the registration. A picture showing the plate has been the deciding factor in several cases. Another common use is to meet a claim by the injured party that he or she is unable to use an arm or leg, bend a knee or work. Patient

and persistent activities in the neighborhood of the claimant's home will usually afford an opportunity for a picture in which an arm is raised or a knee is bent or vigorous muscular work is being done. Sometimes where the liability is clear, such a picture has resulted in a defendant's verdict, because the plaintiff is shown to have lied outrageously. Of course, in common with other railways, we find pictures valuable in showing street conditions with respect to holes, worn pavements, claimed bad rail, or snow and ice."

Along somewhat similar lines, the Ottawa Electric Railway states: "We find that photographs showing damage done in accidents, marks on our cars showing where collision has taken place, condition of streets, etc., make excellent exhibits in court in damage cases. We have also found it advisable before breaking into pavement on city streets to lay tracks to have photographs taken of the pavement before it is disturbed. These are valuable afterward as our contract with the city requires that we restore the pavement in as good condition as we found it."

Many electric railways use photographs as a means of keeping records of the progress of construction work. In some cases, the pictures are taken at regular intervals, but more often they are used to illustrate some particular stage of the construction or some special condition existing at a particular time.

Use of photographs in personnel work appears to be increasing. The Duluth Street Railway has for many years had photographs taken of applicants for positions and prints of these are filed with the applications. This is done by a regular man in the employment department who is furnished with photographic apparatus and material by the company. The Kansas City Rail-

SUMMARY OF PHOTOGRAPHIC WORK DONE BY 50 ELECTRIC RAILWAYS

Company	Public Photographer or Regular Employee	Number Photographs Taken Annually	Principal Uses
Androscoggin & Kennebec Railway, Lewiston, Me.	Public	....	Accidents.
Binghamton Railway, Binghamton, N. Y.	Public	20	Accidents.
Capital Traction Company, Washington, D. C.	Public	20	General records, publicity.
Chicago North Shore & Milwaukee Railroad, Highwood, Ill.	Both	1,000	General records, construction work, community development.
Cleveland Railway, Cleveland, Ohio	Both	4,000	Accidents.
Cumberland County Power & Light Company, Portland, Me.	Public	50	Accidents.
Dallas Railway, Dallas, Texas	Public	300	Construction work, publicity.
Denver Tramway, Denver, Col.	Both	50	Accidents, publicity, general records.
Duluth Street Railway, Duluth, Minn.	Both	100	Accidents, personnel records.
East St. Louis & Suburban Railway, East St. Louis, Ill.	Both	250	Accidents, safety work, general records.
Eastern Massachusetts Street Railway, Boston, Mass.	Both	150	Accidents, way and structure inspection records.
Grand Rapids Railway, Grand Rapids, Mich.	Public	200	Construction work, amusement parks.
Indiana Service Corporation, Fort Wayne, Ind.	Public	100	Accidents, construction work.
Johnstown Traction Company, Johnstown, Pa.	Public	....	Publicity.
Kansas City Railways, Kansas City, Mo.	Employee	2,682	Accidents, safety work, personnel records, publicity.
Kentucky Traction & Terminal Company, Lexington, Ky.	Public	50	Publicity.
Knoxville Power & Light Company, Knoxville, Tenn.	Both	200	Accidents, construction work records.
Macon Railway & Light Company, Macon, Ga.	Public	....	Accidents.
Manchester Street Railway, Manchester, N. H.	Public	2	Accidents.
Market Street Railway, San Francisco, Cal.	Employee	1,555	Accidents, construction work and personnel records.
Massachusetts Northeastern Street Railway, Haverhill, Mass.	Public	....	Accidents.
Memphis Street Railway, Memphis, Tenn.	Public	....	Various.
Middlesex & Boston Street Railway, Jackson, Mich.	Public	20	Accidents.
Mobile Light & Railroad Company, Mobile, Ala.	Employee	100	Accidents.
Nashville Railway & Light Company, Nashville, Tenn.	Both	50	Accidents, construction work records.
New Orleans Public Service, Inc., New Orleans, La.	Public	150	Accidents, publicity.
Northern Ohio Traction & Light Company, Akron, Ohio.	Employee	700	Construction records, publicity.
Northern Texas Traction Company, Fort Worth, Texas	Public	....	Accidents, publicity.
Omaha & Council Bluffs Street Railway, Omaha, Neb.	Both	250	Accidents, publicity, construction work records.
Ottawa Electric Railway, Ottawa, Ont., Canada	Employee	900	Accidents, valuation work.
Pacific Electric Railway, Los Angeles, Cal.	Public	....	Accidents, publicity, construction work records.
Philadelphia Rapid Transit Company, Philadelphia, Pa.	Public	220	Publicity.
San Diego Electric Railway, San Diego, Cal.	Employee	3,500	Accidents, publicity.
Schenectady Railway, Schenectady, N. Y.	Employee	100	Accidents, construction work records.
Shreveport Railway, Shreveport, La.	Employee	50	Accidents, construction work records.
Spokane United Railways, Spokane, Wash.	Public	....	Accidents, publicity.
Springfield Street Railway, Springfield, Mass.	Both	90	Accidents, publicity.
The Milwaukee Electric Railway & Light Company, Milwaukee, Wis.	Public	25	Accidents.
Third Avenue Railway, New York, N. Y.	Employee	1,000	Accidents, publicity, construction work records.
Toronto Transportation Commission, Toronto, Ont., Canada	Both	3,000	Accidents.
Twin City Rapid Transit Company, Minneapolis, Minn.	Employee	400	Construction work records.
Union Street Railway, New Bedford, Mass.	Both	300	Accidents.
Union Traction Company of Indiana, Anderson, Ind.	Public	100	Accidents.
United Electric Railways, Providence, R. I.	Employee	75	Accidents, safety work.
United Railways of St. Louis, St. Louis, Mo.	Public	6	Publicity.
Virginia Electric & Power Company, Richmond, Va.	Both	1,971	Accidents, publicity.
Washington Railway & Electric Company, Washington, D. C.	Public	....	Publicity.
Winnipeg Electric Company, Winnipeg, Man., Canada	Both	....	Accidents, construction work records.
Youngstown Municipal Railway, Youngstown, Ohio	Public	....	Accidents, publicity.
			Accidents, construction work records.

ways and the Market Street Railway of San Francisco are other companies which follow this practice.

Publicity work is another important reason for taking photographs. Two years ago the New Orleans Public Service, Inc., took pictures of its span wire poles throughout the city before removing various unlawful signs, and by picture publicity was successful in preventing the return of this evil. Many pictures are taken by this company for historical purposes, to show development, etc. This railway, however, does not use the photographs themselves in advertising, but to aid the artist in visualizing the subject when he makes line drawings for advertisements.

Recently the Shreveport Railways had a moving picture made for publicity purposes. This showed the unloading of some new cars that had just arrived, their progress through the shop, the machinery, piping, wiring under the cars, then the start of the cars from the carhouse, out onto the lines, the congestion caused by automobiles, and the operation of the cars.

The Virginia Electric & Power Company, while using photographs in various of the usual ways, has also utilized a number of aerial photographs showing pro-

Interurban Bus Lines Operated by City Railway

**Trenton & Mercer County Traction Corporation Has Extended Its Service to Points 65 Miles Distant—
Traffic Shows Marked Seasonal Fluctuations—
All Buses Start from a Central Terminal**

UNDER the name of the Central Transportation Company, the Trenton & Mercer County Traction Corporation, Trenton, N. J., has established an extensive system of interurban and city bus lines. Three city routes are operated, serving districts not previously provided with convenient transportation facilities. Outside the city eight bus routes are operated by this company. In character they vary from suburban service on a route 2.5 miles in length to long-distance service to points as far away as 65 miles.

This long-distance interurban service is the most interesting phase of the company's operations. Bus routes connect Trenton, the capital of the state, with the town of Lakewood, a health resort 45 miles distant, and with the seacoast cities between Asbury Park and



Buses of the Central Transportation Company, a Subsidiary of the Trenton & Mercer County Traction Company, Waiting at the Trenton Terminal

posed rights of way for a transmission line. Aerial pictures have been used also by the Chicago Surface Lines, as told in an article in the *ELECTRIC RAILWAY JOURNAL*, Aug. 8, page 202. Practices of the Boston Elevated Railway and the United Railways & Electric Company of Baltimore also were described in that article.

Cars Faster than Buses in Test

IN ORDER to compare the speed of buses on Fifth Avenue, New York City, and street cars on Third Avenue between Fourteenth and Fifty-seventh streets, checkers of the Third Avenue Railway some time ago carefully timed a number of trips of both vehicles. The distance from Fourteenth to Fifty-seventh Street is 2.1 miles. The average running time of buses was 29 minutes, making the speed 4.3 m.p.h.; average running time of cars was eighteen minutes, making the speed 7 m.p.h. The average number of passengers on the buses at Fourteenth Street and boarding within the area was 54, while on the cars it was 111.

Bayhead, 60 to 65 miles away. A sufficient amount of all-year traffic exists between the seacoast cities and Trenton to pay bus operating expenses even during the winter months. In summer the volume of traffic is much larger and the route is a distinctly profitable one.

Four trips a day are operated from Trenton through Freehold and Asbury Park to Bayhead. Two other trips are operated from Trenton through Freehold to Lakewood. At Freehold connection is made with a short local line operating on an hourly schedule between that city and Asbury Park. For ordinary service two buses are required between Trenton and Bayhead and one between Trenton and Lakewood. Fageol parlor car coaches are used. Short service between Freehold and Asbury Park is supplied by two additional buses, which are Fageols with street car type bodies. Through fare from Trenton to Bayhead is \$2.30. Packages are transported between points on the interurban routes in so far as it can be done without interfering with the convenience of passengers. The rate is only 2 cents per pound with a minimum charge of 25 cents.

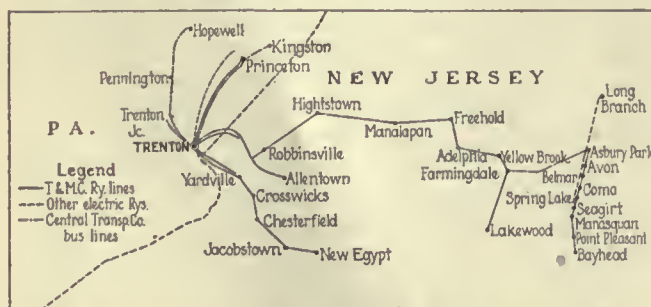


Within the City of Trenton Bus Routes Have Been Arranged so That There Is Little Duplication of Existing Railway Service

Other interurban bus lines are operated by the company to Kingston, Allentown, New Egypt, Hopewell and Chambersburg. On these lines the headways are one hour and two hours. A summary of the headways, number of buses operated, running time and mileage of the various routes is given in the table below. On portions of all the interurban routes the service duplicates that of other bus and railway lines. Where the interurban bus lines of the Central Transportation Company operate on the same streets as the railway lines of the Trenton & Mercer County Traction Corporation the buses do not pick up and discharge local passengers. A similar practice is followed between Asbury Park and Sea Girt, where the buses operate through territory served by the Coast Cities Railway. The relation between these routes and the other car and bus routes of the company is shown on the accompanying maps.

In the majority of cases bus service on these routes was undertaken by the railway to forestall independent operation. Application had been made to operate inter-

Route	Destination	Type	Headway	No. Buses	Running Time
A	Empire Rubber Co.	City	30 min.	2	30 min.
A-1	Municipal Colony	City	30 min.	1	15 min.
B	Labor Street	City	30 min.	3	30 min.
C	Trenton Junction	City	1 hr.	1	30 min.
D	Kingston	Interurban	2 hr.	1	1 hr.
E	Allentown	Interurban	2 hr.	1	1 hr.
F	New Egypt	Interurban	2 hr.	1	1 hr.
H	Hopewell	Interurban	1 hr.	2	1 hr.
K	Chambersburg	Interurban	1 hr.	1	30 min.
K-1	Hutchinson's Mills	Interurban	1 hr.	1	30 min.
	Bayhead	Interurban	4 per day	2	3 hr. 15 min.
	Lakewood	Interurban	3 per day	1	2 hr. 5 min.
	Asbury Park-Freehold	Interurban	1 hr.	2	1 hr.



Long Interurban Bus Routes of the Trenton & Mercer County Traction Corporation Connect Trenton and Seacoast Cities

urban buses on streets where the railway had tracks. The management felt that it would be undesirable for independents to operate in this way, and for that reason the railway itself undertook to supply the desired bus service. In so doing it has endeavored to arrange its routes with a minimum of duplication.

Of the three city bus lines two serve districts somewhat remote from existing car lines. The third is a crosstown route which intersects a number of other transportation lines, making it possible to travel from one outlying section of the city to another without passing through the congested business district. Headways on the city lines are 30 minutes, with fifteen-minute service on a portion of one route.

All of the interurban lines, except the short line from Asbury Park to Freehold, start from the motor coach terminal of the Central Transportation Company on Perry Street. Two of the three city lines also start from this point. A plot of land has been purchased by the company at this location, which is only a few minutes walk from the center of the city. Temporarily a waiting room has been made from two old street car bodies. It is planned to construct a combined waiting room and terminal in the near future.

In regular service nineteen buses are required. Headways are not shortened during the rush hours and no extra vehicles are required at those times. Three buses are kept in the garage each day for inspection and three are ordinarily used for special trips. Two buses are provided for overhauling, making a total of 27. Occasionally it is necessary to double-head some of the seashore trips. Inspection buses or those reserved for special trips are used. The equipment of the company consists of two Macks, two Six-Wheel buses, five Whites and eighteen Fageols, including four of the parlor-car type.

Service Speeded Up by West Virginia Line

THE Monongahela West Penn Public Service Company has been making many improvements in its railway service at Clarksburg, W. Va. A recent statement announces a cut in the running time of its trains between Clarksburg and Weston from an hour and a half to an hour and five minutes.

W. E. Davis, of the company, who announced the change, said the new schedule calls for cars to leave Clarksburg at 5:35 a.m. and every hour thereafter until 11:35 at night. They will leave Weston at 5:10 a.m. and every hour until 11:10 at night. He said:

We have had many requests from our patrons to get them from Clarksburg to Weston and from Weston to Clarksburg a little quicker. To accomplish this we rebuilt portions of our track, equipped the cars for faster operation and installed new passing sidings. All of these things have just been accomplished and we are glad that we are able to offer the new service. I think it will be a very popular mode of travel. We are glad to install the new service, for in doing so we are keeping a promise made to our friends some time ago.

Valuation Principles in Baltimore Case

An Extended Analysis Is Given of the Methods Used Recently to Obtain for the United Railways & Electric Company of Baltimore Figures for Original Cost, Reproduction Cost of Physical Property, Undistributed Structural Costs, Going Value, Depreciation and Present Value

By *W. H. Maltbie*

Special Counsel United Railways & Electric Company of Baltimore

MANY points of interest to the electric railway industry were developed in the valuation case of the United Railways & Electric Company of Baltimore, which was presented to the Public Service Commission of Maryland during the past summer.

Since the methods used in the case were quite typical, the processes are here analyzed to indicate the way the value was built up for presentation to the commission.

The United Railways & Electric Company of Baltimore operates the entire system of street railway transportation in Baltimore and in its outlying suburbs, with the exception of one short spur line leading to a local cemetery and the direct interurban lines without local service operated by the Washington, Baltimore & Annapolis Electric Railway between Baltimore and Washington and Baltimore and Annapolis. It has 433.33 miles of track, of which 245.85 is in paved streets, and operates a total of 1,488 cars. In 1924 it operated 35,973,691 car-miles and carried 228,423,774 revenue passengers, with a total operating income of \$16,453,254.31 and gross operating expense of \$12,293,999.31. Its total capitalization is \$88,134,900, of which \$53,673,700 is bonds, \$14,000,000 income bonds and \$20,461,200 common stock. These figures cover the securities of the United Railways & Electric Company itself, certain bonds of underlying companies, and such securities of its subsidiaries as are held in the hands of the investing public.

The original street railway system of Baltimore was created in 1859, at which time the city, by ordinance, granted certain rights to the Baltimore City Passenger Railway. In view, however, of some uncertainty as to the city's power to enter into an agreement of the sort then attempted, the Legislature granted a charter to the original company in 1862. Thereafter numerous companies were organized from time to time, until Baltimore, like most other cities of its size, had in the '80s and early '90s a large number of competing horse car or cable companies.

The usual era of consolidation followed and the various companies were absorbed by successive steps, until finally in 1899 the present company was created as a complete consolidation of the then existing lines in and around Baltimore.

CIRCUMSTANCES LEADING UP TO THE CASE

Rates of fare had always been fixed in Baltimore by act of the Maryland Legislature, and no change took place from 1900, the year following the consolidation, down to 1918, when the Public Service Commission of Maryland authorized a 6-cent fare.

The Public Service Commission of Maryland, created in 1910, began in 1913 a valuation of the property of

the company. The company engaged the firm of Stone & Webster, which in 1914 made a complete valuation of the physical property of the company and submitted it to the commission for its consideration. The engineering forces of the commission checked the inventory, made an independent valuation of the physical property and in 1915 a series of engineering conferences agreed upon figures to be submitted to the commission covering all physical property except land, buildings and street paving.

There was pending at that time an important statewide valuation case of the telephone company, and hearings on the railway case were temporarily postponed. After this and before actual hearings could be started the unsettled financial conditions resulting from the World War intervened, and by mutual consent of the commission and the company the case was carried over without action. This was a natural and simple solution of the problem in view of the fact that there was pending no request for a change of fare either on the part of the commission or on the part of the company.

The rate of fare at this time in Baltimore was 5 cents with universal transfer, with a gross receipts tax, known as the park tax, of 9 per cent on all fares collected on city streets. The United Railways & Electric Company continued to operate on this fare, despite increased costs, until 1918, when it became evident that some action must be taken. The company therefore, acting under the public utility law, filed 30 days notice of an increase in the rate of fare. The commission objected and a rate case was heard in the fall of 1918, which resulted in the increase to 6 cents above noted. This proved insufficient, and later rate cases resulted in successive increases from 6 cents to 6½ cents, to 7 cents, and finally to the present rate of 8 cents, two for 15 cents.

In an early one of these rate cases the commission adopted as a guide in dealing with this particular company the principle that its return over and above operating expenses, depreciation and taxes should be sufficient to maintain the credit of the company, and that this could be accomplished by allowing the company to earn something between 1½ and 1½ times its fixed charges (i.e., rentals and bond interest), and subsequent adjustments of the rate structure were made in accordance with this principle.

In the spring of 1924 the company filed a petition asking for an increase of the rate of fare from 7 cents to 8 cents or two for 15 cents, pointing out that under the existing rate schedule it was earning less than the minimum of 1½ times its fixed charges and that the increasing costs of operation had wiped out all of the

economies and modifications that the company had been able to devise in the hope of raising its income above this fixed minimum. At the same time the company pointed out that if the commission was unwilling to continue to operate under the theory outlined above, the company stood ready to complete the valuation of its property as a basis for future rate schedules.

The majority of the commission decided that the company was entitled to the increase in rates for which it asked and passed an order putting these rates in effect, but providing for the completion of the valuation case. The third member of the commission was unwilling to make any change in the rate structure until after the valuation had been completed.

PREPARATION OF THE CASE

The ten years that had elapsed since 1914, the date of the completion of the Stone & Webster appraisal, had brought such tremendous changes in unit costs, and even in detail methods of construction, that the company felt that the Stone & Webster appraisal was no longer usable and therefore undertook a complete reinventory of its property and a new valuation. The work was carried on during the fall and winter of 1924 and 1925, and the case finally came to trial on May 4, 1925.

The United Railways firmly believes that the yardstick method of appraisal is fully as efficient as the more detailed method, and certainly much more economical, and its officers in the American Electric Railway Association have voted for the approval of this particular principle. The company has, however, always recognized that the yardstick appraisal does not lend itself to a case where there is apt to be a legal contest and an effort to enforce the technical rules of evidence, and for that reason, face to face with a case of that sort, it proceeded in the usual form of a detailed inventory and valuation.

The entire work was handled by the engineering and legal staff of the company, although expert witnesses who were familiar with special phases of the work were frequently used from time to time during the proceedings.

The appropriation at the disposal of the Public Service Commission was not adequate for an independent, detailed valuation on the part of the commission staff. The company therefore furnished the commission with its detailed inventory as completed, and this was spot-checked or checked until the commission staff was satisfied that the inventory was accurate. The company also furnished the commission with the unit prices used by it in pricing its inventories and with the total figures for each class of property. These were checked and studied by the commission staff, who prepared in this way their own valuation of the physical property of the company.

This work on behalf of the commission was done by its own engineering forces and by Robert M. Feustel, employed as a consulting expert; all of it, however, under the general supervision of the people's counsel, a direct appointee of the Governor provided for in the Maryland public utility law, whose duty it is to act as opposing attorney to the utilities in all important cases.

The company prepared its case on the theory that no one definite measure of value exists, but that all information which can be helpful to the commission should be placed before it, and that in particular the commission should have information with regard to original cost, par and market value of securities, repro-

duction cost at current unit prices and evidence as to whether or not present price levels might be regarded as relatively static.

ORIGINAL COST

On original cost the company took the position that original cost must serve either one or the other of two purposes. The first of these is to constitute a check on the reasonableness of the present-day claim for reproduction cost. The second is to give some index or evidence as to the amount of the investor's sacrifice or the original dollars devoted to the public service. For the first of these purposes the original cost which is desired is the price paid for the various articles when they were first devoted to public service. For the second the original cost desired is the price paid by the present investor, corporate or individual.

Original cost in the first of these instances, namely, the cost in dollars of the property when first devoted to public service, was for much of the present property of the company impossible of ascertainment. The original company, as indicated above, was created in 1859. Numerous other companies were formed and finally brought by a long train of receiverships, purchases, reorganizations and consolidations into the present single company. The lack of any uniform standard of accounting would have made it extremely difficult to determine original cost even if the books of the constituent companies had been in existence, but as a matter of fact many of these had been destroyed in the great fire which struck the business district of Baltimore in 1904, and the remaining records were fragmentary and incomplete. Everything which the company had was placed at the disposal of the commission staff, but all parties were agreed that a reconstruction of original cost as thus defined was impossible.

On the other hand, original cost in the sense of the amount invested by the present corporate owners was fortunately capable of very definite ascertainment. The final consolidation, which took place in 1899, differed from the usual consolidation in which two or more companies pool their stock and issue to the stockholders of the constituent companies agreed amounts of stock of the new company. There were in Baltimore in 1899 two large and two small systems, the large systems having been built up by consolidations of smaller companies. The two larger systems were not able to get together, and finally parties interested in the smaller systems acquired one of the two larger systems by the outright purchase of all but 374 shares out of a total of 140,000 shares of its outstanding stock, and then secured an option at a flat cash price on a majority of the stock of the second large company on the condition that the option price should be open to every stockholder if he desired to take advantage of it.

It was therefore perfectly possible to get a definite starting point, in cash paid plus underlying bonds assumed, for the property which went into the consolidation in 1899, and since the company's records from that date on were complete there was no difficulty in showing the net additions to capital from 1899 down to the date of the appraisal.

The question of whether the purchase of these stocks at the price paid was a prudent investment was answered, from the company's point of view at least, by the fact that the syndicate formed to take over the stocks thus acquired was very largely oversubscribed, that many of the owners of stocks who had an oppor-

TABLE SHOWING SUMMARY OF REPRODUCTION COSTS OF PROPERTY OF THE UNITED RAILWAYS & ELECTRIC COMPANY OF BALTIMORE AS OF JAN. 1, 1924

Account Number	Account	Undepreciated		Depreciated	
		Railways' Reproduction Cost New	People's Counsel's Reproduction Cost New	Railways' Reproduction Cost New	People's Counsel's Reproduction Cost New
502	Right-of-way—(private right-of-way in county from private parties).....	\$745,719	\$167,576	\$745,719	\$167,576
503	Other land used electric railway operations.....	1,850,662	1,336,380	1,850,662	1,336,380
504	Grading—city and county.....	2,239,931	1,864,790	2,239,931	1,625,122
505	Ballast.....	2,093,940	1,781,673	1,758,910	1,692,589
506	Ties.....	1,537,461	1,310,262	1,291,467	851,670
507	Rails, rail fastenings and joints.....	4,050,495	3,463,300	3,402,415	2,493,576
508	Special work (including electric switches).....	2,993,016	2,553,478	2,514,133	1,717,852
510	Track and roadway labor.....	4,825,215	3,706,007	4,053,181	2,408,905
511	Paving.....	3,297,811	2,810,172	2,770,161	2,248,138
512	Roadway machinery and tools.....	119,842	119,842	83,889	83,889
515	Bridges, trestles and culverts.....	1,281,419	1,307,327	1,046,474	1,045,862
516	Crossings, fences and signs.....	97,094	88,983	86,601	77,415
517	Signals and interlocking apparatus.....	153,583	137,579	150,511	123,821
518	Telephone and telegraph lines.....	305	289	274	260
519	Poles and fixtures.....	1,338,820	1,147,253	1,225,020	975,165
520	Underground conduits.....	219,723	189,464	210,934	179,991
521	Distribution system.....	3,852,902	3,261,386	3,449,118	2,870,019
523	Shops and carhouses.....	4,441,435	4,207,565	4,127,027	2,997,029
524	Stations, miscellaneous buildings and structures.....	340,799	222,552	308,452	174,899
526	Park and resort property.....	608,574	489,272	551,190	361,867
529	Other expenditures—W. & S.—Trackless trolley construction.....	45,676	.....	41,108	.....
530	Passenger and combination cars.....	11,985,622	10,504,354	10,805,789	7,353,048
	Passenger and combination cars trackless trolley buses.....	23,411	.....	18,729	.....
531	Freight, express and mail cars.....	52,094	39,322	46,885	19,661
532	Service equipment.....	454,148	477,729	363,318	262,751
533	Electrical equipment of cars.....	6,087,930	5,747,935	5,479,137	4,023,554
536	Shop equipment.....	350,595	350,596	280,476	280,477
537	Furniture.....	270,720	270,721	216,576	216,577
538	Miscellaneous equipment.....	153,012	153,012	92,007	99,458
539	Power plant buildings.....	46,095	43,325	42,868	28,115
540	Substation buildings.....	478,810	448,061	445,293	363,891
542	Power plant equipment.....	169,972	169,972	127,479	118,980
543	Substation equipment.....	1,837,859	1,837,859	1,690,830	1,562,180
544	Transmission system.....	759,898	642,083	683,908	577,875
	Total.....	\$58,804,588	\$50,850,119	\$52,181,743	\$38,338,592
	Engineering and superintendence.....	2,940,229	3,305,258	2,940,229	3,305,258
	Administrative and legal expense.....	1,176,092	.....	1,176,092	.....
	Law expenditures.....	.....	254,251	.....	254,251
	Taxes.....	462,229	462,229	462,229	462,229
	Organization prior to construction.....	1,764,138	.....	1,764,138	.....
	Insurance during construction.....	62,694	.....	62,694	.....
	Miscellaneous.....	.....	2,542,506	.....	2,542,506
	Working capital.....	2,000,000	1,400,000	2,000,000	1,400,000
	Total.....	\$67,209,970	\$58,814,363	\$60,587,125	\$46,302,836
	Interest during construction.....	7,393,097	4,593,149	7,393,097	4,593,149
	Total.....	\$74,603,067	\$63,407,512	\$67,980,222	\$50,895,985
	Cost of financing.....	4,476,184	3,170,376	4,476,184	3,170,376
	Total of reproducible property.....	\$79,079,251	\$66,577,888	\$72,456,406	\$54,066,361
	Going value.....	16,000,000	6,510,789	16,000,000	6,510,789
	Easements—City.....	17,816,292	.....	17,816,292	.....
	Easements—County.....	85,204	.....	85,204	.....
	Right-of-way—(Private right-of-way from turnpike companies).....	283,458	.....	283,458	.....
	Grand total.....	\$113,264,205	\$73,088,677	\$106,641,360	\$60,577,150

of three classes, private holdings in fee simple, perpetual easements acquired by purchase years ago from toll roads, and easements secured by county or municipal grant. The real estate group above mentioned testified as to the cost to reproduce, i.e., to acquire the rights of the first class as of the date of the appraisal. For the second class, and to some extent for the third class, the same group testified only as to the market value of an equivalent area of abutting land, holding that the determination of the value of these rights was a technical question not within their experience.

Buildings—On buildings the company created a committee formed of the heads of three of the largest contracting firms in Baltimore City. Their forces, working with the drawings in the possession of the company, with full access to the structures, and in co-operation with the staff of the commission, prepared a bill of materials for each building owned by the company and then proceeded to estimate a reproduction cost as of Jan. 1, 1924.

Trackage—The determination of the cost of reproducing the track of the company presented a great deal of difficulty. Like most older systems, the company had tried many forms of rail section and various methods of track construction, as well as a large number of different forms of pavement in various parts of the city. These were combined in so many ways that it

tunity to withdraw the cash chose rather to put the cash back into the syndicate, and, finally, that allotments in the syndicate sold on the Baltimore Stock Exchange at a premium of 14 per cent. The company argued from this that, judged by the standards of the day, the investment must have been regarded as a prudent and wise one.

The company showed in this way a total investment of \$69,000,000, exclusive of any allowance to the promoters or any profit to the final syndicate, but including a profit of between 5 per cent and 6 per cent to the purchasers of the first of the large companies.

REPRODUCTION COST

In order to determine reproduction cost the company engaged competent experts, so far as possible not connected with the company, and for the most part local men familiar with existing conditions in Baltimore and with the particular class of property they were to value. Thus for other land used in railway operations the company secured the services of three of the best known real estate men in Baltimore City, thoroughly familiar with all types of real estate, and asked them to make an independent valuation of the land and file copies with the company and with the commission.

Rights-of-Way.—The company's rights-of-way are

was impossible to express the total trackage of the company in standard cross-sections. The engineering forces of the company therefore prepared a detailed statement of the type of track installed and the character of pavement, street by street and section by section. The data for each stretch of track were then transferred to a computing sheet and the various quantities of excavation, rail, labor, ties, etc., determined by a force of computers. The summation of these computing sheets gave a grand total of quantities for the system.

The next step was the determination of unit costs. Rail, ties or ballast presented no practical difficulties. The greatest difficulties were found in determining incidental charges, costs of labor and costs of hauling ballast and material and the removal of waste.

For the determination of incidental costs a careful study was made of the previous experience of this and other companies in large track replacement jobs or new construction. For labor costs careful studies were made of the proper organization of track-laying forces and the amount of work to be anticipated from each gang. For hauling costs the probable locations of yards, dumps and quarries were determined and the weighted average length of haul from each of these to the trackage served by it were computed. From these

figures it was easy to determine a weighted average length of haul for the system for yard material, for ballast and for the removal of excavated waste.

The company was attempting to determine reconstruction cost in the same way that a prudent and careful contractor would make an estimate. For that reason it felt itself compelled to select in every case the most economical method of construction. It therefore estimated all of its track excavation as steam shovel excavation and motor truck haul. It considered carefully the advisability of building from its own rail head and selected building by truck haul as the more practical and in the long run the more economical. For those suburban lines where it had steam road connection it built by steam road methods from its own rail head, leaving till the last step in the process the respiking of one rail, since the gage of the Baltimore system is not the standard gage.

Bridges.—For all of its bridge and trestle work the company secured the services of a local bridge engineer of high standing, not an employee of the company, although he had previously made a study for safety purposes of all of the company's structures of this type.

Rolling Stock.—In view of the fact that a very large portion of the rolling stock of the company had been purchased from time to time from the J. G. Brill Company, the Brill company was employed to prepare a complete reproduction cost estimate of all of the used car bodies and trucks. For this purpose the staff of the commission selected cars which might be regarded as typical of each group or model operated by the company. A complete bill of materials and full detail specifications were prepared for a type car of each group and submitted to the Brill company, which then determined the reproduction cost as of Jan. 1, 1924.

The electrical equipment of all rolling stock and the substation equipment were valued by the Westinghouse company and General Electric Company, each company valuing the equipment of its own manufacture.

Other Items.—The company has only one small power plant, purchasing most of its power from the Consolidated Gas, Electric Light & Power Company of Baltimore. This small plant was valued by a local firm familiar with power plant machinery.

The transmission and distribution systems, office furniture, shop equipment and other corresponding items were valued in detail by members of the company's staff.

DIFFERENCES WITH COMMISSION STAFF

All of these base values of physical property were checked by the commission staff or by other persons employed by the commission for that purpose. To a very large extent the commission staff after this check accepted the base values claimed by the company.

The exceptions were as follows:

Land.—The valuation of land was made for the commission by a local appraiser connected for many years with the Appeal Tax Court of Baltimore City. He differed as to the value of certain lands and showed a total for private rights-of-way and for other lands below that claimed by the company.

Buildings.—The same assessor of the Appeal Tax Court and a local builder checked the unit costs used by the company for building valuation. They objected to certain unit costs in concrete construction and also to certain incidental costs claimed by the company's appraisers, the total difference amounting to between

9 per cent and 10 per cent on the physical reproduction cost of the structures.

Rolling Stock.—On rolling stock the commission staff secured a lower value by determining so far as possible the price originally paid by the company both for cars and for electrical equipment of cars and applying to this original cost a trend curve based upon the labor and material curve prepared by Brill, a price curve prepared by the Westinghouse and General Electric companies, and other data collected by Mr. Feustel from time to time. The result was a figure considerably below the reproduction cost furnished by Brill for car bodies and by the Westinghouse and General Electric companies for electrical equipment.

On this matter, however, the company pointed out that the Brill curve, which was the main reliance of the commission staff on the matter of car bodies, covered labor and material only and introduced witnesses from the Brill organization who testified that no shop costs, overheads or merchandising costs were included in the curve, and that, if these were added, the index as of Jan. 1, 1924, would be much higher than the one shown by the labor and material curve. The difference more than covered the difference between the commission staff figures and those of the company.

Track and Roadway Labor.—On track and roadway labor the commission staff made a number of changes, some increases and some decreases over the figures presented by the company. The net result of the changes, however, was about equal to the change which the commission staff had made in the item of incidentals and contingencies.

Contractor's Profit.—The company had made its estimates on the assumption that certain important pieces of work, such as the construction of buildings, bridges, trackage, distribution and transmission systems, would be turned over to contractors, and had therefore included an item for contractor's expense and profit. The commission staff accepted the contractor idea so far as buildings and bridges were concerned, but rejected it for all track construction and for the transmission and distribution systems.

The company took the position that the employment of a contractor was in the last analysis an economy, in view of the insurance against additional incidentals, omissions and contingencies and in view of the value of the knowledge which an experienced contractor would furnish as contrasted with a new organization.

In support of its position the company introduced as witnesses A. T. Spencer of Toronto, thoroughly familiar with the reconstruction work carried on in that city, and Jonathan Wolf of the Chicago Surface Lines, thoroughly familiar with the work done there. In both cases the work had been done by the company's own construction forces, and the witnesses testified as to the percentage added to base cost of labor and material to cover actual costs of incidentals, contingencies and various overhead charges. This testimony supported the company's claim that its total cost, including the contractor's expense and profit, was reasonable.

With respect to the employment of a contractor on the transmission and distribution systems the company introduced witnesses who testified that it would be impracticable to build a construction organization sufficiently large to do the work involved in the limited time assumed for reconstruction purposes, and that the most economical way, as well as the only practical way if the work were to be accomplished within a limited

time period, would be to employ one or more contractors for the job.

Unused or Obsolete Property.—In connection with reproduction cost the company made no claim for property not used or useful. Thus it eliminated certain lands which it still holds but which are not used for railway purposes, a large number of cars which have been retired although not yet scrapped or written off the books and some buildings and power plant machinery not in actual operation.

The company attempted to make its position in these matters entirely clear to the commission, as follows: So long as the commission is considering original cost or investment, any property, once acquired, should remain in the rate base until such time as it has been amortized through payment made by the public in excess of a fair return. If, however, the question is not one of investment but one of present value, then superseded property or property no longer used or useful does not enter into the problem except, in some instances, as an evidence of the cost of developing the business, or, in other words, as evidence of the cost of one of the elements of going value.

Undistributed Structural Costs.—The claim of the company under this head was made up of the following items:

- For engineering and superintendence, 5 per cent.
- For administrative and legal expense, 2 per cent.
- For taxes, actual taxes for one year upon the present property other than income tax.
- For organization cost prior to construction, 3 per cent.
- For insurance during construction, actual insurance for one year on present property.
- For working capital, \$2,000,000.

On all physical property plus the undistributed costs above described the company claimed interest during construction of 11 per cent, and on the sum total of the previous items plus interest during construction a cost of financing of 6 per cent. The figure for interest during construction was reached by assuming:

1. A four-year construction period.
2. That the money necessary would be acquired at the beginning of the period at a cost of 7 per cent.
3. That the funds so secured would be deposited or invested in quickly negotiable securities and drawn upon as needed, so that against the 28 per cent of total interest charge there would be a credit of 3 per cent on half the money for all of the time, or a total credit of 6 per cent, making the net interest charge 22 per cent.
4. That half of this would be earned by operations during the construction period.

The result of these assumptions is a net claim of 11 per cent, as stated above.

For these undistributed costs the commission staff recommended the following:

For engineering and superintendence, 6½ per cent, intended, however, to cover the contractor's engineering, while the company's claim covered only its own engineering in addition to that necessary for the contractor.

For legal expenditures, ½ per cent.

For miscellaneous expenses, covering some additional allowances to the contractor, pre-organization expense and administrative expense, 5 per cent.

For taxes the commission staff recommended the allowance of the company's claim.

For interest during construction, 8 per cent.

For cost of financing, 5 per cent.

For working capital, \$1,400,000.

GOING VALUE

The existence of going value and the propriety of its inclusion as a rate base was admitted by the commission staff, and it recommended a flat allowance of

10 per cent of the reproduction cost of physical property. The company, on the other hand, attempted to analyze going value and to determine the elements which enter into it and to make some estimate of their value.

The company's position on this matter, which is set forth in considerably more detail in its brief,* may be summarized as follows:

Going value is the sum of those elements which distinguish a concern in successful operation from a new concern fully built and equipped but not yet ready to operate. It is a by-product of operation, beginning to develop as soon as operation commences and increasing as long as the concern grows in experience, increases its knowledge of local conditions and continues to develop its tributary territory.

Various elements enter into going value, but the following may be specially noted:

The development of a trained personnel, not only of the executive staff but of routine workers as well.

The accumulation of valuable records.

The realignment of physical properties, traffic routes and operating personnel.

The supersession of property on account of local peculiarities of the situation.

The ability to maintain a trained staff of experienced workers by utilizing the company itself as a training school.

The development of suburban territory from lean traffic territory into fully populated urban areas.

The cost of producing some of these elements may be very definitely measured. For example, the company knows how much it costs to train motormen and conductors and knows also what it would cost to train them outside of its own operating system. It is also able to estimate with a considerable degree of exactness the actual cost of training other employees, either in the system as an operating whole or by the aid of outside instructors imported to train a new staff and operate the plant during the training period. It is also possible to determine the cost of reproducing many of the valuable records possessed by the company, or the cost of creating them in the first instance. These costs were not presented by the company as the final measure of value but as a minimum value, since it is obvious that a sensible operator could not be persuaded to destroy a record by merely paying him the cost of its reproduction, or to dismiss an experienced employee by merely paying the cost of training his successor.

On the other hand, it is possible to throw light upon the value of records or of experience by estimates of the increased cost of doing business without them. This increased cost per annum, capitalized at a fair rate of return, gives a sum which is undoubtedly greater than the value of the record or the experience, but it indicates, nevertheless, the magnitude and the importance of the element that is under consideration.

The company holds that going value, if existent, is the property of the company without regard to the question of whether the expense of creating it had been paid for as an operating cost. It recognized the fact, however, that in addition to the legal claim to going value the company has a still stronger equitable claim in those cases where the net return from operation during the period when going value was being developed has been less than a fair return. For this reason

*A limited number of copies of this brief are available for distribution to those interested.—W. H. M.

the company presented a statement showing the shortage of fair return below 6 per cent from the time of the consolidation in 1899 to 1916, and below 8 per cent from 1916 to the date of the valuation. This computation of shortage of income below fair return was not presented as proof of going value, but merely to strengthen the right of the company to claim going value by showing that the actual cost of creating it was borne by the stockholders and not by the public, even although it was charged to operating cost.

Limiting its claim to an amount equal to the shortage of fair return, the company thought if necessary only to establish minimum cost of creating going value rather than the higher figures which might have been shown by a consideration of the savings in operation and the increase in income due to the possession of going value. The company therefore submitted testimony indicating that breaking in a new organization, acquiring local experience, building the necessary records, developing the necessary schedules and meeting such realignment of property and method as might be necessary would cover a period of four or five years, and that the cost (in increased expense and decreased revenue) necessarily involved would amount to about \$6,500,000; that the supersessions which would be involved in adjusting a street railway system of this size to local conditions would reasonably be estimated at about \$3,000,000, making a total for these items of \$9,500,000.

Under the head of the development of traffic the company filed detailed maps showing the condition of the residential area surrounding the city of Baltimore as it stood just before the introduction of cable or electric lines and the same territory as it is today. The contrast was extremely striking and fully explained why these same areas in the period from 1899 to 1911 showed a constantly and steadily increasing traffic and a constantly increasing net return over and above operating expenses, taxes and depreciation. Measuring the stabilized return finally received from the lines serving these suburban areas against the total returns during the development period, the company had a very fair measure of the cost of developing these areas, amounting to \$7,000,000.

The total for these four elements is \$16,500,000. The shortage in fair return, above referred to, amounted to \$16,000,000. The company therefore presented a claim for going value of \$16,000,000.

RIGHTS-OF-WAY

A peculiar situation exists in Maryland with regard to the rights of a street car company in the streets. The original franchises granted in Baltimore City were for a period of fifteen years, renewable automatically for additional periods of fifteen years unless the municipality gave notice of its desire to purchase the property, and the act incorporating the original company provided that in event of such a purchase the city should buy all the property, including the franchises, at a fair value. Many of the franchises for operation on streets now in the city limits were granted originally by Baltimore County before the territory in question was annexed to Baltimore City, and these franchises were, almost without exception, perpetual franchises without any reserved right of repossession. Subsequent franchises granted by the city are of various types, but a very high percentage of the total right-of-way is of one or the other of the above types.

A few years after the consolidation of the various street railway companies into the United Railways a general attempt was made in Baltimore to increase the taxable basis of the city by including the street rights of the various public service corporations. The natural method would have been to place a value upon the franchises, but one peculiarity of the Maryland taxing system is that the personal property of a corporation is not assessed by the local authorities in each municipality or county, but by a state board. The local board could not assess franchises and the state board did not. The local board therefore set up a distinction between a franchise and an easement, claiming that a franchise is the mere intangible right to lay tracks in the street and, as such, admittedly personal property, but that when a company had once laid tracks in the street and started to run cars on them, or laid gas mains in the street and started to supply gas through them, it acquired, in addition to the intangible right known as the franchise, a tangible interest in the land known as an easement.

The matter was carried in three separate cases to the Court of Appeals of Maryland, the court of last resort in the state, and in every case the contention of the local taxing body was upheld. The law is therefore clearly established in Maryland that in addition to its intangible or personal franchise rights a public utility utilizing space in the city streets possesses a definite interest in real estate called an easement, classed by the Court of Appeals as property, as valuable property, and as subject to taxation.

The company therefore claimed a value for its easements based on the facts that they were not originally given to the company, but were in exchange for a valuable consideration; that the original contract provided that they should not be taken except by payment of the value at the time of taking; that their value figured largely in the price paid to the constituent roads at the time of the consolidation; that they had definitely been passed upon by the Court of Appeals of the State of Maryland as an interest in real estate, and that they had been the subject of taxation as real estate.

The valuation of the easements of the company was based upon the same general method as that used by the city of Baltimore in valuing easements for taxation purposes, and the total value for easements and private rights-of-way amounted to between \$18,000,000 and \$19,000,000.

DEPRECIATION

The company took the position that the investment to be considered as evidence of present value is the total unamortized investment, and that no deduction should be made from it for depreciation unless the inventory of property included property purchased out of a depreciation reserve contributed by the public in excess of a fair return. But in considering reproduction cost as evidence of present value, the actual physical condition of the property may properly be taken into account. For this reason the company presented detailed studies of the per cent condition of its property. The commission staff presented studies of per cent condition on certain schedules, but on others attempted to determine depreciation either by the straight line average life basis or by a combination of average life studies plus inspection. The total allowance for per cent condition shown by the company

amounted to about \$6,500,000; the total depreciation claimed by the commission staff to \$12,500,000.

PRESENT VALUE

The company took the following position as to present value:

1. That there is no definite and formal measure of present value.
2. That original cost is not indicative of value unless it has been incurred within a relatively recent period or at least within a period over which there has been relatively small change in unit costs of labor and material.
3. That the par value of securities is not in general an index of present-day value.
4. That the market value of securities, while in some cases it indicates the collective business judgment as to the total value of the property, tangible and intangible, of a corporation, is not such an index at this time when the market value of securities issued in the pre-war period is depressed on account of their low rate of return.
5. That reproduction cost is not necessarily a measure of present value, since a building or a piece of machinery may not be suited for its purpose, may not be properly located, or may not have been maintained in proper condition.
6. That whenever a piece of property is well adapted for its purpose and is serving an essential use (so that if it were non-existent some one else would be compelled practically to duplicate it) its present value differs little, if any, from its reproduction cost less such sum as may be necessary to put it in first-class operating condition.

The sum total of reproduction cost of used and useful property plus easements and going value presented by the company to the commission amounted to \$113,000,000. The company offered no direct evidence as to present fair value except the testimony of its president that the present fair value of this property was at least \$85,000,000.

The case is in the hands of the commission, which has not yet handed down an opinion. A tabulation of the comparative values found by the Public Service Commission staff and those presented by the company is given on page 71.

Oil-Electric Locomotive for Long Island Railroad

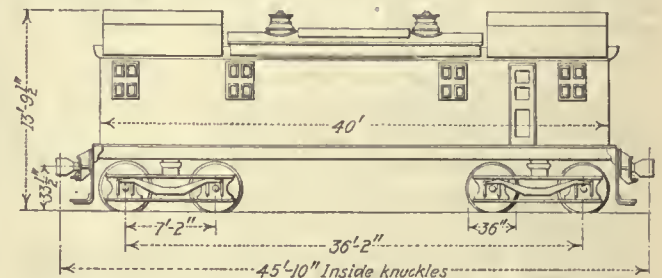
This Equipment Is Intended to Supplement Electric and Steam Equipment Now in Service and May Be Operated Over Electrified Sections of the Road

FOR switching service in its Bushwick terminal the Long Island Railroad has just purchased a 100-ton oil-electric locomotive. This locomotive has a steel box-type cab with platform carried on two four-wheel swivel trucks. The cab is divided into three compart-

ments, the central compartment containing the power plant and control apparatus, and the two end compartments for the operator.

The oil engine is furnished by the Ingersoll-Rand Company, the mechanical parts by the American Locomotive Company, and the electrical parts by the General Electric Company. Two oil engines are used. These are of the six-cylinder vertical four-cycle type with pistons of 10-in. diameter and 12-in. stroke. Each develops about 300 hp. at 600 r.p.m. Direct-connected to each oil engine is a six-pole, 600 r.p.m., direct-current, compound-wound, commutating-pole generator. A four-pole, 60-volt generator is also mounted on the same shaft as the main generator and serves to excite the field winding. A 32-volt storage battery supplies current for the exciter fields at low speed.

Four direct-current series motors of railway type G.E.-69-C are used for driving. The gearing provides a maximum allowable locomotive speed of 30 m.p.h. The control equipment is entirely automatic. With the differential winding of the generator the output in



Outline of 100-Ton Oil-Electric Locomotive to Be Operated in Switching Service by the Long Island Railroad

amperes and volts automatically adjusts itself to meet the requirements of the service and the power delivered by the engine. The only operating handle is the throttle that controls the output of the engine. An electric switch handle determines the connection of the motors in series or in parallel and for forward and reverse movement. No rheostats are used.

After the series parallel switch has been set for either forward or backward movement the throttle handle determines the power delivered by the engine. The generators and motors transmit that power to the driving wheels, automatically adjusting the proportion of tractive effort and speed to the load on the locomotive, and automatically changing these proportions to suit the varying requirements of acceleration or grade.

Auxiliary equipment includes a gasoline-engine-driven air compressor; three high-pressure air storage tanks, to be used for starting the oil engines; a water heater and expansion chamber to prevent the cooling water from freezing when the engines are not operating and for heating the operator's compartment; four fin-type radiators on the roof for cooling water from the engines; exhaust pipes and coolers on each oil engine and water tanks in the cab, into which the water may be drained in the winter when the locomotive is idle. Some of the general dimensions of the locomotive are given in an accompanying table.

GENERAL DIMENSIONS OF THE LONG ISLAND OIL-ELECTRIC LOCOMOTIVE	
Length inside knuckles.....	45 ft. 10 in.
Length over cab	40 ft.
Height over radiator	13 ft. 9 1/2 in.
Width over all	10 ft.
Width of cab	9 ft. 4 in.
Total wheelbase	36 ft. 2 in.
Truck wheelbase	7 ft. 2 in.
Total weight	200,000 lb.
Weight per driving axle	50,000 lb.

Seven tower wagons of the line department of the Los Angeles Railway, Los Angeles, Cal., are being wired in the battery shop of the garage so that the red warning lights will be illuminated with electricity from the truck battery. Previously, red lanterns have been put on the towers at night.

The Readers' Forum

"Journal's" Analysis of Coffin Prize Presentation Commended

EASTERN MASSACHUSETTS STREET RAILWAY
CHELSEA, MASS., Dec. 1, 1925.

To the Editor:

The JOURNAL is to be congratulated on the excellent manner in which analysis has been made of the briefs of competing electric railways for the 1925 Coffin prize.

Each one of the briefs submitted undoubtedly dealt in detail with a great many important problems, and it is practically impossible for the industry as a whole to study all of the complete briefs. It is therefore refreshing for busy executives to gather from the pages of the JOURNAL knowledge of outstanding accomplishments in each of the six principal subdivisions upon which the award of the Charles A. Coffin Gold Medal was made.

To the mechanical man interest, of course, centers on economies in operation, and methods and practices outlined in such orderly fashion are sure to spur us on to even greater efforts. A single thought frequently serves as the basis for substantial monetary savings when applied to our own particular situation.

To the creators of the Charles A. Coffin Foundation great credit is due. They have inspired electric railway operators to put forth increasingly progressive achievements. The widespread publication of results of individual and combined accomplishments of the several competing companies is of almost equal importance to the industry as a whole. It is largely through this means that the rank and file of the industry can absorb valuable suggestions and promptly proceed to apply such new practices in their efforts better to serve transportation.

W. C. BOLT,

Superintendent Rolling Stock and Shops.

Motorman or Locomotive Engineer

MILWAUKIE, ORE., Jan. 2, 1926

To the Editor:

Interurban electric railways as a rule have sprung from street car systems. In certain respects this has been a handicap. Interurban operators are beginning to realize that it pays nowadays to get away from street railway ideas. In other words, they are copying steam road practices.

This brings up the subject of motormen. What is a motorman? Ask that question of a dozen people and probably every one would answer: a man who operates a street car. The word motorman has been associated with street cars so long that the general public thinks of only such men as operate street cars.

If an interurban electric railway dresses up a man in a blue uniform and a cap with the word "motorman" attached and places him at the controller a kind of stigma seems to hang over the railroad because of the street car idea. Why not throw away those blue uniforms and motorman badges? Allow the motorman to wear overalls and jumpers and place badges on their caps reading "engineer" or "electric locomotive engineer" instead of "motorman." It is not necessary to hire steam locomotive engineers to do this. Interurban

motormen today operate equipment that entitles them to the title "engineer." The fact that trains are operated by electricity should not be taken as an excuse to classify engineers as motormen.

Perhaps interurban operators hesitate to allow their motormen to be called engineers because of the wage question. Every motorman in heavy interurban service knows that the responsibility of a locomotive engineer rests upon his shoulders. He is not fooled by placing a motorman's badge on his cap. The Brotherhood of Locomotive Engineers recognizes motormen in heavy service as engineers and accepts them into its organization. The title "motorman" is not recognized. Most electric railroads pay their trainmen all they are financially able to pay, and the name "engineer" could not have any bearing on wages.

On the Pacific Coast there are four interurban electric roads that give the title of "engineer" to their motormen. On three of the roads the motormen wear "engineer" badges. The public never makes the mistake of referring to such roads as street car lines. In fact, they are known as railroads; even the word interurban is more or less conspicuous by its absence.

GEORGE W. BOOTH,
Electric Locomotive Engineer.

Railway Assists in Community Drive in Baltimore

THE United Railways & Electric Company, Baltimore, Md., recently had its conductors and motormen take an active part in a campaign being conducted to raise the Community Fund, a drive held to enable 29 various agencies to carry on their relief and welfare work during the coming year. The company itself gave \$6,000 to the fund and the employees gave \$7,800. But in addition officials of the company arranged to have the car crews perform an important task. On one day during the campaign more than 1,000 conductors and motormen distributed 100,000 subscription cards to passengers, making it easier for them to give and also bringing the fund forcibly to their attention. The work was done between 9 a.m. and 3:30 p.m. As each passenger passed the conductor one of the subscription cards was presented. In cases where the conductors' work was too heavy for them to give attention to the task the cards were distributed by the motormen as the passengers alighted.

Fire Gong at Railway Clubroom*

FIRE protection is assisted in a novel way in El Paso, Tex. A fire alarm gong, connected to the city fire alarm system, has been installed in the clubroom of the El Paso Electric Railway. Any fire call turned in from any point in the city is thus announced to the dispatcher on duty, who immediately calls the inspector of the division from which the alarm came and tells him the location of the fire. In this way the inspector is able immediately to investigate and call out hose jumpers and other equipment necessary to keep the cars in operation without interruption to service. The installation of this gong has enabled the railway to maintain regular headways and avoid delays in cases of fire.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

Association News & Discussions

C.E.R.A. Annual Meeting at Indianapolis

ON THURSDAY and Friday, Jan. 28 and 29, the Central Electric Railway Association will hold its annual meeting at the Lincoln Hotel, Indianapolis, Ind. The session will be opened Thursday at 9:30 a.m. by the presidential address of Frank R. Coates, president of the association and president of the American Electric Railway Association.

The following program will be presented after the president's address:

Morning Session

"Electric Railways, Now and in the Future," by Britton I. Budd, president Chicago, North Shore & Milwaukee Railroad.
"Economic Trends of Interurban and Bus Service," by R. H. Pinkley, assistant general manager Milwaukee Electric Railway & Light Company.

Discussion by A. C. Elinn, vice-president and general manager Northern Ohio Traction & Light Company; R. N. Graham, manager of railways Pennsylvania-Ohio Electric Company; R. R. Smith, vice-president and general manager Chicago, South Bend & Northern Indiana Railway.

Afternoon Session

"Economics of Modern Cars," by Charles Gordon, assistant vice-president McGraw-Hill Company.
Discussion.

"Winning of Public Good Will," by L. J. DeLamar, president and general manager Grand Rapids Railway.
Discussion.

Report on Work of Master Mechanics' Association, by T. H. Nicholl, president Central Electric Railway Master Mechanics' Association.
Discussion.

Demonstration of Foremen's Conference, by Henry H. Norris, educational adviser Boston Elevated Railway.
Adjournment.

Evening Session

Annual Dinner — Indianapolis Athletic Club—Informal.

Address by Lucius S. Storrs, managing director American Electric Railway Association.

"Some Hoosier Philosophy," by W. W. Herschell.

Friday Morning Session

Report of secretary-treasurer.
Address by Miss Helen E. Steiner, director of public relations Ohio Public Service Company.

Election and installation of officers.

Speakers at New York Association Meeting Announced

WILLIAM F. STANTON, secretary of the New York Electric Railway Association, sends word that the paper on motor bus operation and automobile competition, for which the author was not announced in the program for the convention on Jan. 27 published last week, will be by Ernest A. Murphy, general manager United Traction Company of Albany.

The title of the paper, mentioned in last week's issue, to be presented by a representative of the Cleveland Railway at the convention, is "Economical Practices of the Cleveland Railway." It will be presented by Charles H. Clark, engineer maintenance of way, and will include the exhibit of six reels of moving pictures showing economical

practices, particularly in track construction, followed by the company.

It is possible now to give the third speaker at the banquet in the evening. This is Strickland Gillilan, who has a wide reputation for witty after-dinner speaking.

The convention, as already announced, will be held at the Hotel Commodore, New York, on Wednesday, Jan. 27.

Paper on American Transport Situation Published in England

A PAPER by Walter Jackson, Mount Vernon, N. Y., on "Electric and Petrol Transport of Passengers in America" was read before the Institute of Transport, London, England, on Oct. 20, 1925, and recently reprinted from the journal of that society.

American Association News

Cleveland a Possibility for Next Convention

CLEVELAND, Ohio, is under consideration by the committee on location for the next convention of the American Electric Railway Association,

which is tentatively scheduled for next October. The city has excellent facilities for the purpose. The auditorium is well known as the place where the Republican national convention was held in 1924. It has two floors available for exhibit purposes, each with about 25,000 sq.ft., or a total space of 50,000 sq.ft. The appointments of the building are excellent. It was designed for exhibitions and is supplied with all facilities, including steam, gas and electricity. The lighting effect of the auditorium is considered one of the finest in this country.

Directly across the street is the armory, which also has about 50,000 sq.ft. It is suitable for the display of heavy machinery and equipment. Together the space available would be about the same as that used last year at Atlantic City.

Hotel accommodations are said to be excellent. Furthermore, Cleveland is within easy reach of the great Middle Western territory, which includes a large proportion of the electric railway and bus operations of the country.

Several members of the committee on location visited Cleveland yesterday in order to inspect the facilities available and determine whether it would meet the needs of the association. These included Chairman C. E. Morgan, Executive Secretary J. W. Welsh, Director of Exhibits F. C. J. Dell, J. H. Alexander, Morris Buck, H. J. Kenfield, J. C. McQuiston, W. C. Parker, A. L. Price, A. M. Robinson, and L. W. Shugg.

Industrial Education as Applied to Rubber Manufacturing*

BY C. S. CHING

Manager of Industrial Relations,
United States Rubber Company

THE question of training and educating employees is a mighty interesting one. Especially is this so to me in my present field of activity. It is just as important to us in the manufacturing industry as it is to the public utility. In my present connection with the United States Rubber Company, we have gone through various stages of educational work. We have gone through the stage of exposing people to certain educational courses and hoping that some of it would stick, but it doesn't work. And please don't think that I am criticising or commenting on anything that has been said here tonight, because I think that what we have just heard is a splendid exposition of educational work as applied to public utilities.

I am going to relate some of our own

*Abstract of paper presented at meeting of Metropolitan Section, American Electric Railway Association, held in New York, Dec. 11, 1925.

COMING MEETINGS

OF

Electric Railway and Allied Associations

Jan. 14-15 — Kentucky Association of Public Utilities, Annual Meeting, Brown Hotel, Louisville, Ky.

Jan. 20-21 — Central Electric Traffic Association, Miami Hotel, Dayton, Ohio.

Jan. 22-23 — Central Electric Railway Accountants' Association, Miami Hotel, Dayton, Ohio.

Jan. 26-29 — Society of Automotive Engineers, Annual Meeting, Detroit, Mich.

Jan. 27 — New York Electric Railway Association, Hotel Commodore, New York, N. Y.

Jan. 28-29 — Central Electric Railway Association, Lincoln Hotel, Indianapolis, Ind.

Feb. 11 — Central Electric Railway Master Mechanics' Association, Portage Hotel, Akron, Ohio.

Feb. 24-26 — Electric Railway Association of Equipment Men, Mobile, Ala.

April 13-16 — Southwestern Public Service Association, Galveston, Tex.

experiences. We have gone through a further stage of "bringing up father," in educating foremen not knowing how to go about it. We spent at one time approximately \$75,000 in buying educational courses and exposing our foremen to them.

We then went into educational work on our own account, and the greatest success we had in training supervisory forces was in getting the people in a particular plant under the supervision of a man who knew how to prepare and write an article on a specific thing, and then after presentation of a given subject to have a lively discussion.

Please keep in mind that our problem is slightly different from yours, because we operate 53 factories in various parts of the country, some of them having 150 employees and some of them having 5,000. At the present time we maintain regular schools for the training of operators in nearly all factories. The school is apart from any other activity in the factory. The plan of our training is of course to train the operators to do better their particular jobs, but also to give them some instruction pertaining to the policy of the company, its problems and its aims. However, to my mind none of our educational courses is going to be worth anything without our having what Mr. Hass described here a minute ago as the proper relationship between the company and the employee.

We have done considerable recruiting of college men in our industry. We have done a great deal of it in the past and went too far with it. Now it may have been our fault, it may have been the fault of the organization of American industry, it may have been the fault of the man himself, or it may have been the fault of college training; but we did discover, after a while, that you can't have too many racehorses on a farm.

We found that we were getting too many college men into our factories without sufficient opportunity for those men, and believe me, you can have one real nice party when you get about 35 or 40 college men in a plant for about a year and a half and have no place to which to promote them. I don't know what we are going to do with all of the college men in the future or where there are going to be places for all of them in American industry. However, I do know this, that the average college man is not willing to look forward to a foreman's job in a rubber factory. If he does and he is satisfied with that, there is something wrong with him or his education.

We have college men as managers of our technical departments, and central laboratories, as chemists and in our selling departments. However, in the actual process of manufacturing rubber we found that we were overrun with college men and were worried to know what to do with them.

We have, I think, too much of a habit of striking a line and saying that all of the intelligence is above and all of the brawn below. There are a lot of people here tonight who have their present jobs because they were damn lucky, and there are just as good men as I am operating street cars in Boston today at the front end of the car.

Turning to our own operations, it is interesting to note that 94 per cent of our payroll is distributed in piecework. It is evident that a large part of our business is the manufacturing process.

After several lectures at Dartmouth last year, I had a talk with Harry Wellman, who is in charge of vocational training, and I asked what was the trouble with industry or with the university that we can't seem to get together. Mr. Wellman's answer was, "I'll tell you the trouble—the trouble is that you do too damn much coddling." Now there you have the opinion of a man who has been in industry and who is now in a college.

One thing that we are doing that helps our industrial situation is to take the mystery out of business. There wasn't any mystery in it to begin with, but a lot of people thought so. The company takes its operating statements, analyzes them, pares them down to their elements, and explains them in the light of each department's activities. Every workman knows in simplified terms what the company is doing and the relation of his work to the company.

We have a system in one of our plants which is one of the most effective I know of, whereby every day a record of each individual department, together with a complete record of the production of the plant, is put on the blackboard every morning by the foreman, and everybody watches it and notes the percentage of waste. We display everything we possibly can relating to the operation and to the cost of production in dollars and cents. In one department the mere posting of the amount of waste of one expensive material resulted in a marked decrease in this waste the following week.

Now I believe our big task is to try to convince our own people of the problem at hand. It is becoming more and more a problem for American industry how to best utilize the man from the neck up and not the rest of him. If we are going to get anywhere in our industries that is what we have to do. We must make the machine and power accomplish our manufacturing, and manpower should be used to build the machine and to guide its work.

Promotional Work as Practiced by the Brooklyn Edison Company*

R. V. RICKCORD

Manager Personnel Service Department,
Brooklyn Edison Company

MOST of us who have been in contact with public utilities for any length of time, and certainly with men like Matthew F. Sloan, Henry L. Doherty and Mr. Menden and a few other big men, cannot be in their presence very long without feeling that terrific driving spirit of service. Only by close contact with these men is the realization driven home that the giving of high-grade service is a serious problem and requires tremendous effort all the time to accomplish results.

*Abstract of paper presented at meeting of Metropolitan Section, American Electric Railway Association, held in New York, Dec. 11, 1925.

An important aid in the development of employees capable of furnishing the high standard of service required by these leaders is the diversified educational work practiced by many companies.

In the promotional and educational work conducted among our employees the clerical and sales employees are enabled to take the commercial courses and the technical employees the technical subjects, and the trade employees have available certain technical classes in addition to the training offered to develop skill in the trade itself. For instance, we have a school for linemen, another for cable splicers and still another for meter testers. For supervisors of various departments we have a complete course of conferences. In order to train new employees we have a course for cadet engineers in which we give specific, properly supervised work in the several departments of the company and a certain amount of specific research work accompanied by periodic lectures on the latest developments in the company.

To augment the work of the technical employees and the cadet engineers, the company has constructed and has maintained extensive laboratories equipped with different kinds of machines in which series of tests are made in many ways similar to the electrical laboratories maintained in the universities. An attempt is always made to emphasize the practical application of the technical subjects as they affect the specific work of our company.

[Note—The paper was well illustrated by a number of slides showing the organization of the educational work, the class rooms and laboratories.—EDITOR.]

Special Reports Available

FOLLOWING is a list of special reports that have been prepared by the bureau of information and service of the American Electric Railway Association. These reports are available to member companies upon request:

Bulletin No. 59. Wages of Employees Other Than the Trainmen. Gives for about 225 companies a classification of employees and the wages paid each class in the shop, barn, way and structures, power, overhead line and storage departments. Also shows the number of hours worked weekly, the average weekly wages earned, overtime rates, and number of employees in each department.

Bulletin No. 60. Electric Railway Financing in 1925. A list of new securities issued in 1925 showing the type of securities, the amount issued, the surety date, interest rate and offering price. The bulletin also contains a summary of securities defaulted, retired or refunded during the year, the securities of companies abandoned, and a statement of the net change of electric railway capitalization during the year.

Bulletin No. 61. Trend of Material Prices. A new edition of the association's compilation bringing down to date the trend of prices of materials used by electric railways as furnished by the manufacturers of those materials.

Bulletin No. 62. Electric Railway Fares in Cities Over 25,000 Population. Gives a brief record of recent fare history in each of the American cities of 25,000 population or more, arranged alphabetically. It is preceded by a summary showing the number of these cities operating at each rate of fare during the years 1917 to 1925 inclusive, with a chart showing the distribution and trend of fares during the same period.

In addition to the above, supplements to the Fare Bulletin, Wage Bulletin, Bus Wage Bulletin and Cost of Living Studies (Bulletin No. 63) have been prepared bringing them down to date.

Maintenance of Equipment

Filling Cracks in Concrete Pavement*

DEVELOPMENT of cracks and the subsequent frost action from moisture getting into the cracks and breaking up the surface of the pavement is the major trouble experienced by the Denver Tramway, Denver, Col., in connection with concrete pavement. This class of trouble has been entirely eliminated by use of a special method of filling in the cracks. Compressed air with a nozzle pressure of 80-lb. per square inch is used for cleaning out the cracks, and the surface is then painted with a special concrete primer paint of a highly penetrating nature. The paint consists of a solution of asphalt and a light petroleum oil. This primer coat dries rapidly and as soon as it is dry a hot asphalt of a special nature is poured into the cracks.

Prior to adopting this practice two difficulties had been encountered in the maintenance of concrete paving. The first of these was that it was found almost impossible to make any asphaltic material that was poured into the cracks hot adhere to the concrete for any length of time. This difficulty was solved by the ap-

plication of the primer paint, which bonds the tar or asphalt. The second difficulty was from the slight movement which takes place in the concrete during the winter months. This broke the asphaltic material filler. This latter difficulty was solved by the use of the material known as soft Allenite, which retains its plasticity during extremely low temperatures.

Two men operate the equipment for doing this work. The equipment consists of a Ford 1-ton truck with body, an air compressor and a tar kettle. These are all linked up so as to move as a unit.

Such supplies as paint, Allenite, kindling wood, red flags, and other tools are carried on the 1-ton Ford truck. The air compressor is electric-driven, taking current from the trolley wire. Hose 150 ft. long with a special $\frac{1}{4}$ -in. nozzle is used to blow dirt out of the cracks. A pyrothermometer is used to determine when the Allenite is heated to proper temperature.

The same equipment is used also on reconstruction work that is to be paved, in order to waterproof the construction joints on each side of the track between the company's paving and that placed by contractors for the city. The maintenance of joints between the city's dummy strip and the car track concrete has been reduced materially by the insertion

of asphaltic joint filler, which keeps the concrete surface from becoming abraded as cars pass over the track.

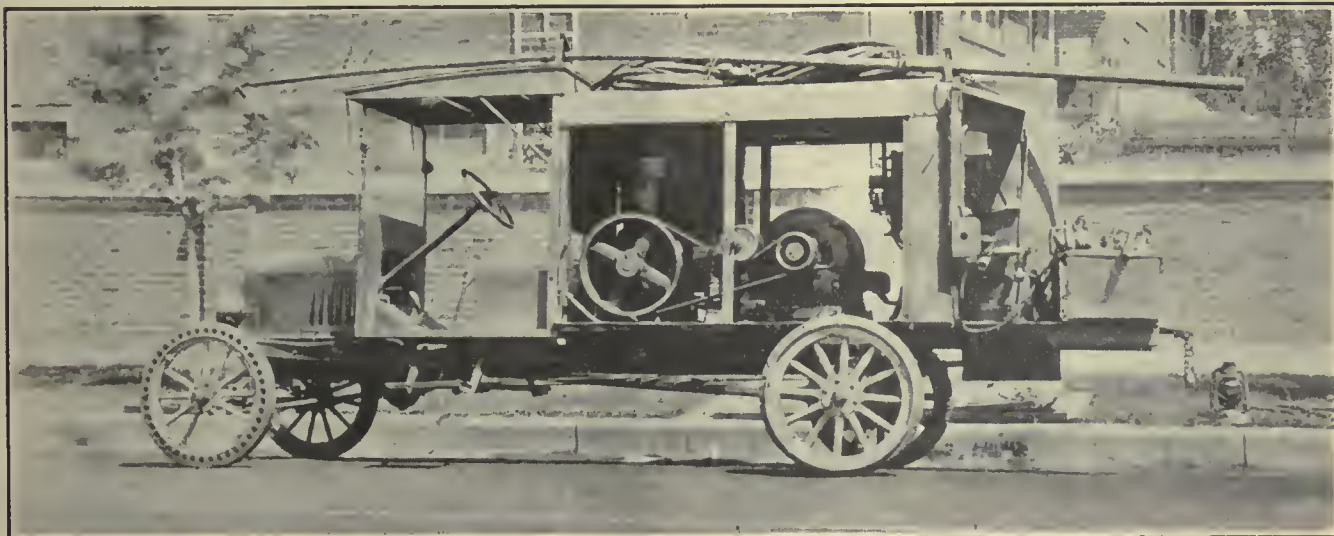
Night Inspection of Trolley Wire*

SEVERAL years ago the Northern Texas Traction Company was having many trolley wire breaks on its city lines. In 1921 there were 313 breaks, or an average of approximately one break per day. At times there have been as many as twelve trolley wire breaks in a single day. In an attempt to decrease such interruptions to service a system was devised whereby a line crew would be available at night for inspection duty. Prior to the inauguration of this inspection schedule the night crew did nothing but stand by in case of trouble. This crew consisted of one truck driver and one lineman, together with a 1-ton Ford tower truck.

For the night inspection work a spotlight was placed on top of the tower. The lineman on this inspection truck stayed up on the tower while the truck was driven slowly under the overhead so that the lineman could inspect the hangers, ears, sleeves, frogs and trolley wire. Parts

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

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Electric-Driven Air Compressor Mounted on Ford Truck

reported by the night crew were repaired by the day line crew.

After this night inspection was undertaken it was found possible for the crew to go over the line at least once a week. It was left to this crew to see that flaws in the overhead were reported before a break occurred, and if a break occurred soon after an inspection had been made it reflected on the efficiency of the night crew. As a result of this work the total trolley breaks on the entire system of overhead construction have steadily decreased from 313 breaks in 1921 to six breaks for the first six months of 1925.

Rolling Scaffolds Used for Building Maintenance

ONE of the distinctive features embodied in the design of the recently completed Everett shops of the Boston Elevated Railway is the large amount of window space. The walls of the buildings consist chiefly of brick columns with large window areas between. Along the entire length of the roof of each building is a skylight. These large glazed areas have created a problem in building maintenance because much of the sash and glass is not readily accessible for painting and repair. To solve this problem rolling scaffolds of the type shown in accompanying illustrations have been provided. These scaffolds are simple iron frameworks supported on wheels which follow a track running around three sides of the building.

Because the fourth side opens onto the transfer table runway and is provided with doors for all tracks it has small window space and the scaffolds are not used there. A somewhat similar scaffold has been arranged for each skylight. It is expected that the time required for repainting sash and repairing glass will be much reduced as a result of the installation of these scaffolds.

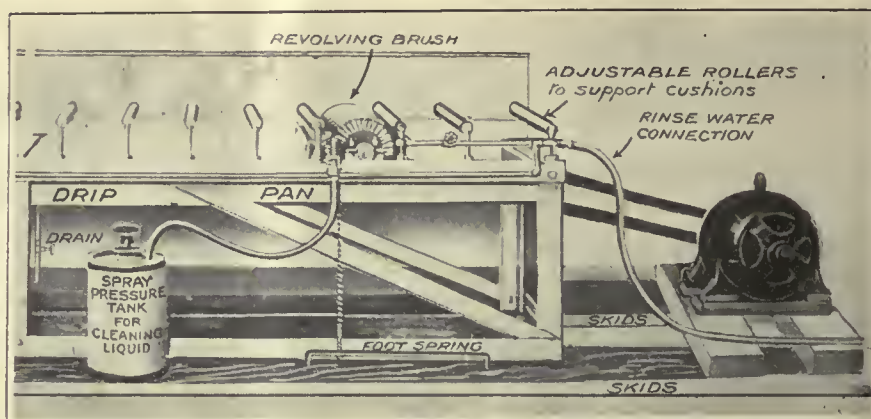
Machine for Cleaning Cane Seats

DURING periods of overhauling it is very desirable to clean the surface of cane seats and backs. The Richmond Light & Railroad Company, New York, N. Y., has recently installed a machine manufactured by the Wilson-Imperial Company of Newark, N. J., which is illustrated

in the accompanying view. The cane seats and backs when removed are moved back and forth on the table consisting of a series of rollers and the wire brush, which is revolved by the motor and cleans the seats with the aid of the special cleaner supplied by the manufacturing company.

The cleaner is placed in a tank under pressure and is applied across the surface of the brush from the pressure tank by means of the pedal. When the seat has been cleaned, the dirt and surplus cleaner is flushed off by turning on the rinsing water connection. The excess material falls in the tray below and is drained away.

While this material can be used by means of a hand brush the capacity of the machine process is much larger, since one man can clean the seats of several cars in the course of a day.



Single Brush Cleaner Used by Richmond Light & Railroad to Clean Cane Seats When Cars Are Overhauled



Scaffold Suspended from Rollers on Overhead Track Is Useful in Building Maintenance



Skylight Scaffold Used at Everett Shops of Boston Elevated Railway

New Equipment Available

Extremely Sensitive Bond Tester Produced

SEVERAL outstanding features have been incorporated in a new bond tester just announced by the Roller-Smith Company, New York, N. Y. The new tester is more than five times as sensitive as the most sensitive instrument hitherto produced by the company for this work. This enhanced sensibility permits the use of a single No. 6 dry cell as the source of rail current.

One of the first essentials in testing rail bonds is sufficient current in

make special provisions in order to secure the needed rail current.

Various expedients have been used for this purpose, such as a portable storage battery, grid and other resistances, and in some cases special cars carrying motor-generator sets. All of these have the disadvantage that they include extra equipment which may be costly to operate and rapid testing cannot be made.

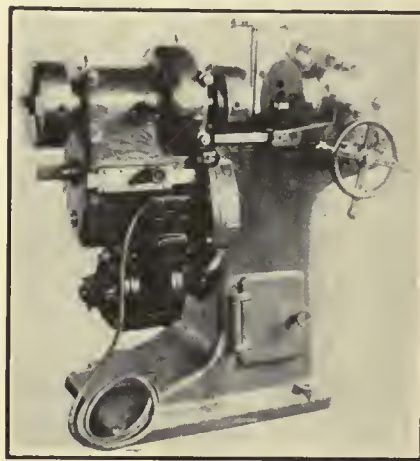
By providing an extremely sensitive instrument, the difficulty of a supply of rail current is overcome in the new Roller-Smith bond tester. Referring to an accompanying illustration, which shows the special contact bar used with the new BBT instrument, it will be noted that the dry cell is mounted in a bracket carried on the upright members. Built-in connections run from the dry cell to the rail contacts at the extreme end of the horizontal members. A foot-operated push switch is interposed in the battery circuit, which is located just to the side of the upright members. The center rail contact and one of the adjacent contacts span the bond, while the center contact and the one at the other end span 3 ft. of rail. When all is ready, the contact bond is dropped on the rail and the bar is run back and forth a few times so that the saw-blade contacts will bite into the rail head. The battery switch is then depressed with the foot and a reading is taken. The manually operated needle is rotated until the small galvanometer needle is at zero. The large pointer then indicates the resistance of the bond direct in units of foot of rail length.

Of course, where the normal rail current is adequate, the dry cell need

not be used. The latter, however, is small in size and does not increase the weight materially.

Portable Pipe-Threading Machine

DESIGNED to meet all pipe-threading requirements, but with wheel mounting so that it is portable, a new power pipe-threading machine has been placed on the market by the Chicago Pipethread Machine Company, Racine, Wis. The machine will thread pipe from $\frac{1}{4}$ in. to 2 in. diameter and can also be used to thread rods and bolts. Three speeds are obtained through sliding gears and lever control. A clutch for starting and stopping the ma-



Pipe-Threading Machine with New Features

chine is located on the spindle. All gears are machine cut and run in oil.

At the rear of the die head is located the cut-off attachment, which is extra heavy. All sliding parts are accurately machined and gibbed to prevent vibration. The reaming tool is mounted on the cut-off block and is actuated by turning the handle toward the center of the machine after the cut. This can be accomplished without changing the location of the die head.

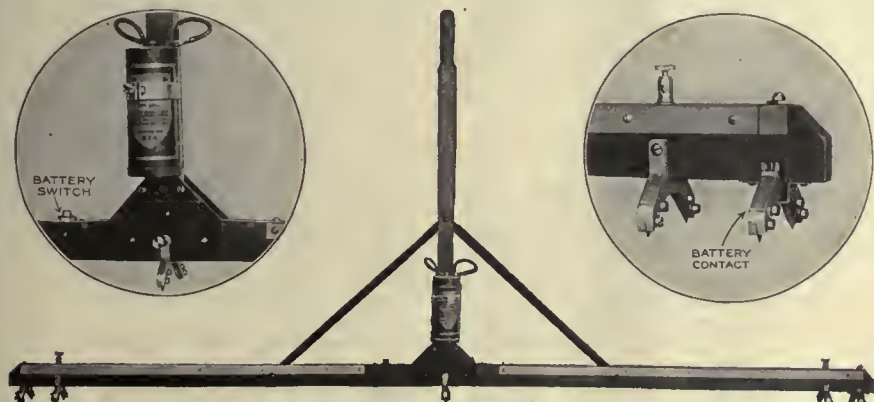
The spindle is of heavy construction with a hole large enough to pass the coupling. Chucks are mounted on each end, the front chuck being equipped with pipe-holding jaws, while the rear chuck is only a centering device for holding long lengths of pipe. Gripping chucks can be applied at both ends if desired. The spindle runs in large bearings that are replaceable when worn.

An oil pump of the centrifugal type is provided which runs at 1,800 r.p.m. It is located at the lowest level of the reservoir. The oil reservoir is located in the pedestal base.



New BBT Type Bond Tester

the rail to actuate the bond tester. The method of measurement most commonly used is based on a comparison of the drop through the bond with the drop across a definite length of rail. On busy city lines there is usually a sufficient number of cars in service to provide the current necessary for bond testing, but on new construction, on interurban lines and at the ends of long lines it frequently becomes necessary to



At Left, the Dry Cell Is Mounted on the Center Upright. In Center, Special Contact Bar Used in the Bond Tester. At Right, Saw-Blade Contacts Bite Into the Rail

The News of the Industry

Rapid Transit Suggestions at Boston

Recommendations Made to Legislature Wants Steam Lines and "L" to Co-ordinate Service

A planning board of which Henry I. Harriman is chairman has reported to the Massachusetts Legislature on desired future developments of the rapid transit system for Boston. It proposes an eventual co-ordination of the Boston Elevated Railway with the steam railroads which enter Boston, but says that this calls for another year of careful study and asks for an extension of time to Jan. 1, 1927.

For the present the board recommends that the Chelsea division of the Eastern Massachusetts Street Railway be added to the Boston Elevated and the service given by the Elevated. It says that the Elevated should not be required to buy it, neither should the city of Boston finance it; but the state should buy the Chelsea division and lease it to the Elevated.

THREE SPECIFIC RECOMMENDATIONS

Three specific recommendations along this line are made, as follows:

1. For the acquisition of the Chelsea division of the Eastern Massachusetts Street Railway by the Boston Elevated Railway.
2. For the assessment of betterments in connection with future rapid transit extensions.
3. For the construction of rapid transit lines outside of the city of Boston by or under the supervision of the Department of Public Utilities.

Further the board makes suggestions for studies for future extensions of rapid transit for Metropolitan Boston. Among other things it concludes:

1. That most of the subways now used by trolley cars and the viaduct to Lechmere Square should at an early date be equipped with trains as parts of through rapid transit routes.
2. That all rapid transit routes should, if possible, be through routes without dead-end terminals in the heart of the city, thus giving a wide distribution of passengers in the downtown section and avoiding excessive congestion at any station.
3. That new subway stations should have a platform length of from 450 ft. to 500 ft. Such platforms will accommodate either a ten-car East Boston Tunnel train or a six-car Cambridge Subway train.
4. That reserved ways in certain avenues may properly be used in part for rapid transit trains.
5. That wherever possible rapid transit lines should utilize or parallel existing steam tracks, thus avoiding expensive subway construction.
6. That terminals of rapid transit lines should in most instances be located from 3 to 4 miles from the State House. Approximately half of the population of the metropolitan area lives within a 4-mile circle of the State House, and the bulk of the suburban traffic originating beyond the 4-mile limit uses railroad rather than Elevated service. It will thus be seen that if rapid transit terminals are located from 3 to 4 miles from the State House rapid transit service will directly serve a very substantial proportion of the city's population, and the number of passengers who must change at terminals will be greatly reduced. The Harvard Square and Everett

terminals are almost exactly 3 miles from the State House. The present Forest Hills terminal and the new terminal of the Dorchester Subway are or will be about 4 miles out.

7. That wherever it is feasible to do so betterments should be assessed upon private property to pay for a part of the cost of rapid transit extensions. There can be no doubt that rapid transit service adds greatly to the value of much nearby property; and this division can see no reason why property that is benefited should not pay a reasonable betterment assessment and thus lessen the financial burden of the car rider.

Ultimately the following rapid transit extensions will be needed, according to the board:

1. Out Commonwealth Avenue to the Brighton district.
2. Out Beacon Street to Brookline.
3. Out Huntington Avenue to Brookline.
4. An extension through Lechmere Square and Somerville to North Cambridge.
5. An extension from the Everett terminal to Malden.
6. An extension of the present East Boston Tunnel to Revere or Chelsea or both.
7. Out parallel to the Midland Division to Dorchester.

New Year Starts Well in Twin Cities

Patrons in Minneapolis and St. Paul Accept Fare Advance Gracefully—
Story of Terms of Settlement Reviewed Briefly—
Company Has More than 100 Buses

RESIDENTS of Minneapolis and St. Paul met with equanimity the higher rate of fare in the Twin Cities ordered for Jan. 1, 1926, by the Minnesota Railroad and Warehouse Commission. The public and the press alike admit that the fare of 8 cents cash with six tokens for 40 cents appears to be necessary to return 7½ per cent upon the valuation as agreed.

The reason for this reaction is not far to seek. After several years the controversies with the Minneapolis Street Railway and the St. Paul City Railway are over, the expensive litigation at an end and employment of experts in valuation proceedings is stopped. As President Horace Lowry of the railways has said:

We are now on a cost-of-service basis, which is the only way by which the interests of the public and the companies can be protected and a high state of service maintained.

St. Paul is well satisfied inasmuch as a higher rate would be required in that city than in Minneapolis because of the difference in cost of operation, amount of travel and extra high assessments by the city. These assessments, however, are likely to be reduced by the city upon petition by the railroad and upon suggestion by the commission. Were the company's taxes in Minneapolis reduced to a 4 per cent basis of gross earnings, as applied to telephone companies, the reduction in taxes would be \$352,000 a year. This would of course affect fares favorably.

Up to and through the war period Twin City passengers paid 5 cents flat. Later this was raised to 6 cents flat. This was changed to 8 cents cash and ten tokens for 60 cents by an emergency order by the commission made on July 3, and effective Aug. 1 for a test of six months. About 10 per cent of the passengers have paid 8 cents. The commission now finds the estimate of the probable number of cash passengers was wrong.

Meanwhile, after the question of fare determination had reached the federal

court, a proposal presented by Mr. Lowry suggesting a compromise was accepted by both cities. This agreement took into account the property valuations made by the commission as of Jan. 1, 1925, as a time saver, leaving for future consideration any necessary changes to bring these up to date. Application was made to the commission for a permanent rate and on Dec. 22 that body ordered for both cities a fare effective Jan. 1, 1926, of 8 cents cash, as now, and six tokens for 40 cents.

The order affecting St. Paul finds the company, on the basis of operating expenses for 1925, should have had a fare of 7.14 cents a passenger.

NEW RATE AVERAGES 6.8 CENTS

The average new rate of fare is 6.8 cents, the average asked by the city was 6.65 cents and by the company 6.92 cents. It will be seen that the rate fixed by the commission is between the city and company figures. The commission estimated that an average fare of 6.91 cents is needed to return 7½ per cent on the stipulated valuations of \$26,787,228 in Minneapolis and \$16,196,090 in St. Paul, but the commission says on this point:

We have the assurance that all the earnings of the Twin City Motor Bus Company, which, like the railways, is a subsidiary of the Twin City Rapid Transit Company, in excess of 7½ per cent will be divided between the railways of Minneapolis and St. Paul. This excess is expected to bring a substantial revenue to the car lines.

Calculations by the commission necessarily were made partly upon estimates of operating expenses for the two lines to complete the figures for 1925. The companies recently increased the wages of trainmen and also added service at rush hours, which made an increase not expected when negotiations were begun for the new rate.

There was a matter of increased freight on coal, which later was adjusted by the companies.

Total operating expenses in Minneapolis before and after taxes for 1925 were determined thus:

Railway operating expenses estimated, 1925 after 1925 adjustments, before taxes.....	\$5,109,967
Further adjustments for 1926, 60 additional trainmen, starters and inspectors.....	66,807
Increased service proposed, 459,000 car-miles.....	84,134
Increase of 2 cents an hour per trainman.....	81,149
Way and structural equipment expense, adjustments to make estimate conform with company estimates for 1926.....	25,187
Reduction on law and valuation expense from total of \$65,599 to \$50,000.....	—15,599
	\$5,351,645
Taxes assignable to railway operations.....	847,675
Total operating expenses and taxes.....	\$6,199,320

The tax rate has been increased from 69.16 to 73.37 per \$1,000, assessed valuation increasing the local taxes to be paid in 1926 by the company \$35,543 over 1925. This makes the assessment against the Minneapolis Street Railway 10.4 per cent of gross revenues in 1925 if there is no change in the federal income tax. The commission says that since this percentage of gross revenue is 50 per cent greater than the average taxes paid by electric railways of the United States in 1924, with the \$35,543 increase and local taxes and state taxes for 1925, these taxes will be \$652,932, including federal income tax. This amounts to about 8.7 per cent of the gross revenues estimated for 1925.

In regard to the St. Paul case the commission said:

The fare which we have this date fixed, which will yield to the Minneapolis Street Railway a reasonable return on the fair value of the railway property within the city of Minneapolis, we therefore fix and establish for St. Paul.

It was expressly stated there should be no change in the transfer privileges. It was also incorporated in the Minneapolis order that the Fort Snelling reservation comes within the one-fare limit from Minneapolis.

Although the Twin City Rapid Transit Company, operating the Minneapolis Street Railway and the St. Paul City Railway, was permitted in the final decision to redeem the outstanding tokens Jan. 1, 1926, at 6 cents, the company made no announcement of its intentions until late Dec. 31, and from that time until midnight the conductors were swamped with purchasers at the old rate. It is estimated the company stands to lose \$17,000 by this friendly act. At least 2,500,000 tokens were still out on Jan. 1. Where tokens were unavailable patrons were instructed to pay 6 cents cash fare until midnight, the company waiving the extra 2 cents cash because it was unable to supply the demand.

Through the dissolving of an injunction brought by a stockholder of the Minneapolis & St. Paul Bus Line, Inc., against the sale of that property to the Twin City Rapid Transit Company, the railway will acquire the remaining independent bus line between Minneapolis and St. Paul. It operates through the University and Como Park districts of the two cities. This line has twelve modern buses. The purchase price is reported to be \$105,000. Acquisition of this bus line will give the railway 100 buses.

In addition the Twin City Rapid Transit Company operates through a

subsidiary the Twin City Motor Bus line between Minneapolis and St. Paul, the American Auto Bus Company line between St. Paul and Minneapolis and suburbs and the Intercity Transportation Company between St. Paul and Stillwater.

What Basis, Fares at Detroit

The matter of increases in fare at Detroit, Mich., has not been formally presented to the Street Railway Commission, but the subject is being studied by the commission's engineers. The present rate of fare in Detroit is 6 cents cash with nine tickets for 50 cents and an additional charge of 1 cent for a transfer. Extending service to Redford, which has recently been annexed to Detroit, will call for considerable increase in the length of haul on the Grand River car line.

The questions under consideration relate to the adoption of the zone system of charging fares commensurate with the length of hauls or keeping the fare uniform and raising it to cover the increased cost of the longer hauls. The justice of raising fares all over the city to pay for carrying passengers to the newly annexed districts is being considered with the alternative of each passenger paying for the ride he takes.

Col. H. U. Wallace, general manager of the Department of Street Railways, said recently:

I am certain that, so far as present services are concerned, there will be no increases. What we have to do is face the question of long haulage to recently annexed territories, such as Redford.

We propose to establish a bus service to Redford about next June and we have under investigation the question whether we can make this extension and meet the expense out of general revenue; whether we should make this individual service self-supporting, and whether it would be fair to saddle car riders in general with any deficit that might be met in operating this service. None of these questions has been decided.

But there will be no increase in fares so far as present car riders are concerned. On the contrary, the department is planning to meet all expenditures, most of which should be capital, out of revenue. Our budget of next year calls for about \$1,500,000 outlay, but this will be met by earnings.

We are paying the Detroit United Railway 25 per cent of our profits to amortize its debt. That is a real achievement in the history of municipal ownership. In another six years we shall have fully met that obligation and the money then will be available for improvements and possibly for fare reductions. Our problem is to hang on for six years, give adequate service and at the same time incur no further obligations.

That we are aiming to do. We hope to take care of maintenance, repairs, sinking fund charges and operating expenses out of revenue derived from a 6-cent fare. We hope to make adequate improvements out of the same revenue. If we can do this for the next six years we shall have made the department pay for itself. After that we shall be free to improve the service considerably and possibly reduce fares.

Mr. Storrs Outlines Progress for the Press

Lucius S. Storrs, managing director of the American Electric Railway Association, says that 1925 was marked by distinct progress in the local transportation industry. In a statement which he made to the daily press in the interest of the industry Mr. Storrs said electric car and bus service is being rapidly co-ordinated under single managements in most communities, electric lines are being modernized, credit is being slowly restored, and the public, realizing the necessity for good

common carrier service under responsible electric railway agencies, is showing an increasing desire to work with local managements in solving current problems.

He explained that the initial efforts of the Advisory Council have been directed toward effecting sensible co-ordination and modernizing properties and thus improving credit. Useless competition, resulting in duplicated service and doubled and tripled fares, is being supplanted by community-wide service under single managements operating economically. More than 250 electric railways now are operating bus service with some 5,000 vehicles over about 12,000 miles of route. This represents an increase over 1924 of 80 operating companies, a doubled number of buses and tripled miles of service. Mr. Storrs explained that the importance of this changed situation is not so much in miles of added service as in the recognition of managements that they no longer are merely rail operators, but general transportation agencies ready to render service by any useful vehicle the public demands.

The local transportation situation as leaders see it was summarized by Mr. Storrs as follows:

A demand for good transportation, both by electric car and motor carriers, exists. It is the duty of electric railway companies, as the oldest and most reliable transportation agencies, to supply this transportation. They will supply it with the most modern equipment as rapidly as possible.

Franchise Negotiations at Richmond Halted

Luke C. Bradley, president of the Virginia Electric & Power Company, Richmond, Va., expressed regret at the present halt in negotiations to obtain a blanket traction franchise because of provisions required of the company by the streets committee of the City Council. He regards the terms sought to be imposed as excessive. The committee proposed to recommend a 5 per cent tax on gross receipts and the removal of toll charges on the company's viaducts, but sought to require the company to continue paving between tracks. Mr. Bradley said:

We do not feel that it is fair to the company nor to the car rider that the city impose on them over and above what it imposes on any other individual or corporation a gross earnings tax, which can tend only to stifle a proper expansion of Richmond's transportation facilities and make the cost of fares to the car rider more expensive.

No Jitneys in Savannah

There are no more jitneys now in the city of Savannah, Ga. The one remaining line there ceased operating on Dec. 31, 1925. The regulatory ordinance passed in May designated Oct. 1 as the last day the jitneys would operate. The jitney people took this matter to the courts and they were allowed under a temporary injunction to operate until their 1925 licenses expired. The city took the matter to the Supreme Court of Georgia hoping to get a decision before the year was out. However, the Supreme Court has up to this time handed down no decision. The theory as to their right to operate the balance of the year was confined to their licenses having been issued for the full year. The licenses, however, have now expired.

Transportation Committees of Springfield and Worcester Meet

Two joint committees, composed of civic representatives, officials of the Springfield and Worcester properties, and representatives of the New York, New Haven & Hartford Railroad, were recently formed and initial meetings of each have been held.

In Springfield the Board of Survey, composed of Clark V. Wood, president of the Springfield Street Railway, and W. J. Flickinger, vice-president of the Connecticut Company, now under the management of the New York, New Haven & Hartford Railroad, met for the first time on Jan. 5 and secured considerable data from the city traffic expert, J. T. B. Woodruff, who will assist the committee in its investigation. Primarily, the findings of this committee and the traffic expert will form the basis of a report on transportation in Springfield. Coincidentally in Worcester, Mayor O'Hara and President R. L. Whipple of the Chamber of Commerce have appointed the following committee to study the Worcester transportation situation: William C. Mellish, city solicitor; Prof. Albert S. Richey, Worcester Polytechnic Institute, and F. H. Willard, vice-president and general manager Worcester Consolidated Street Railway. These men will confer with Clark V. Wood, president of both the Worcester Consolidated Street Railway and the Springfield Street Railway, and W. J. Flickinger, vice-president of the Connecticut Company, who represents the New Haven interests. This committee has been authorized to study the railway situation in Worcester. It will start its work immediately.

All of this work has a direct bearing on the possible rehabilitation of both of these properties by the New Haven Railroad. Certain legislation will have to be accomplished before it will be legally possible for the New Haven to re-establish its interest in these properties. The New Haven naturally desires the co-operation of the two cities in obtaining this legislation and has therefore been instrumental in the formation of these committees to study the situation and determine whether the cities wish to go on as now or prefer to have the New Haven exercise control and rehabilitate the properties.

Fare Increase Sought at Albany

It is said that a modified petition for an increased fare, specifying no amount, but asking a "fare rate," will be presented to the city officials of Albany, Troy, Rensselaer and Cohoes by the United Traction Company. In its petition, the company will say that after operating buses in Albany and Troy as feeders for its main lines, it has been found the company with the present 7-cent fare still will suffer a shortage of approximately \$300,000 for the twelve months ended Dec. 31.

Ernest Murphy, superintendent of the company, is reported to have said that the company will first seek relief from Common Council of Albany, and if that fails, will file a fare petition with the Public Service Commission. A petition for a 10-cent fare, filed a year ago,

was temporarily withdrawn when the city of Albany granted the company a franchise to operate buses in Western Avenue and to the Arbor Hill section, suggesting that further action be delayed pending actual experience from revenues derived from the feeder lines.

Result of Ontario Elections

Hamilton Abandonment Averted—St. Thomas to Have Buses—London in Deadlock

Residents of Hamilton, Ont., were able to indulge in the usual holiday merriment because the expected abandonment of service by the Hamilton Street Railway was averted for about five weeks. At practically the last moment the company agreed to accept the city's proposal to negotiate for a new agreement and to submit the agreement to the voters on Feb. 11. The possible suspension and eleventh hour avoidance of it were brought about by the defeat of the two railway by-laws, on Dec. 7, referred to in the *ELECTRIC RAILWAY JOURNAL*, issue of Dec. 12, 1925, page 1048. The people opposed the city's purchasing the system and also opposed the company's receiving a 25-year franchise.

To insure continued service the City Council on Dec. 9 approved a plan to submit a new agreement to the people within 60 days. The Council's action does not mean that the city has withdrawn the application of Dec. 8 to the Ontario Railway Board to operate the street railway. This application will merely be held in abeyance pending negotiations with the company. Should the city and the company fail to reach an agreement, meriting another vote of the people, then the Council will halt such negotiations and call upon the Railway Board to act.

The terms under which the company and city agree to carry on for 60 days are:

1. That the city enter into an agreement with the company and forego its percentage and mileage charges during the period in question.
2. That the Board of Control and the Civic Street Railway Committee be authorized to negotiate with the company respecting a new agreement to be submitted to the electors prior to Feb. 11, 1926.
3. That the Board of Police Commissioners be requested not to issue any additional jitney licenses from Dec. 11 until Feb. 11.

The defeat of the by-laws in Hamilton was a surprise. Only a few days previous to the vote the Hamilton Street Railway had consented to revise the proposed franchise agreement by giving the city the right, at the close of any five-year period, to purchase the system upon certain conditions. This condition had been accepted by the Board of Control and street railway committee of the Council. The company's original stipulation was that one year's notice of purchase would be required and that the purchase price would be 10 per cent more than the valuation of the company's assets. It voluntarily went further than that, submitting instead of a straight 10 per cent bonus demand a sliding scale which reduces the bonus percentage at stated periods in the life of the agreement.

The company had advised the city

authorities verbally on Sept. 30, and formally on Nov. 3, through the press, that unless some workable agreement was reached, it would have to cease operation.

The latest development in the London situation reveals that the London Street Railway has been allowed a 5-cent fare for 60 days pending a new agreement. However, the City Council on Dec. 30 refused the company's application to order the independent buses off the streets and service has been terminated. The London Council has issued an ultimatum to the company to define its plans within forty-eight hours. The immediate trouble in London dates back to Dec. 12, when the Ontario Railway and Municipal Board issued an order requiring the company to revert to the old rate of fares, seven tickets for a quarter good between certain hours and nine for a quarter good between other hours. In London, as in Hamilton, abandonment was averted at the busiest time of the year by the announcement of a special meeting of the City Council called in an endeavor to have the railway continue until a new franchise could be discussed. Later reports stated that the London Street Railway at a special meeting of the finance committee of the City Council would lay a proposal before that body for a complete service of street cars and buses with slightly higher fare and universal transfers.

In St. Thomas, another city of Ontario, the trolleys are to cease operating on March 1. At the wind-up meeting of the 1925 City Council the by-laws carried at the election on Dec. 7 discontinuing the railway and accepting a bus transportation proposition were read for the third time and formally passed. The contract with the bus company provides that the new system will come into operation within 60 days of the signing of the contract. The St. Thomas Municipal Street Railway operated 6.5 miles of line.

Detroit United Adds Cars to Combat Buses

The Detroit United Railway, Detroit, Mich., has added ten interurban cars on Detroit-Royal Oak division on a fifteen-minute schedule. The previous schedule was 20 to 30 minutes. The Detroit Motor Bus Company has petitioned the Public Utilities Commission to operate buses on fifteen to twenty-minute schedule between Detroit and Pontiac and D. U. R.'s action is seen as an attempt to combat bus competition.

Agreement Among St. Louis Holders

Security holders of the United Railways, St. Louis, Mo., have reached a complete agreement on terms for the reorganization of the system. Federal Judge Faris of the Eastern District of Missouri was so informed on Jan. 5. A termination of the receivership of the company is anticipated within a reasonably short time. The court continued until Feb. 15 the hearing of the consolidated foreclosure suits brought against the property under which the receivership will be dissolved.

Fare in Spokane to Be Contested

Despite reports generally accepted that the City Commissioners of Spokane, Wash., would not contest the new street car rates filed with the State Department of Public Works of Washington by the Spokane United Railways, the City Council voted unanimously on Dec. 30 to protest the fare increase.

Charles A. Fleming, Mayor, and James M. Geraghty, corporation counsel, were authorized and instructed to oppose the increase, at a hearing to be held in Spokane about Jan. 15. Previously, officials of the Department of Public Works announced they had been told the United Railways and the Spokane City Commissioners had agreed upon the new fare of 10 cents cash with five tickets for 35 cents, which was to become effective on Feb. 1.

Intensive Development Planned in San Francisco

Samuel Kahn, new executive head of Market Street Railway, San Francisco, Cal., now under H. M. Byllesby & Company's control through United Railway Investment Company and its subsidiary, California Railway & Power Corporation, says it is the Byllesby purpose to continue to operate the lines in accordance with the best public utility practice and also to continue their development. He is reported to have said:

It is our purpose to protect our investment here by efficient operation and by taking the public into our confidence. We are entertaining no plan nor are we contemplating any step toward actual sale of the properties to the city.

Mr. Kahn denies reports that the company will campaign for increased fares and that it is proposing a bond refunding operation.

Since Byllesby interests have obtained control of the Market Street Railway, a compromise has been effected with the Pacific Gas & Electric Company over litigation which resulted when the tram company sued to enjoin the power company from collecting \$420,000 on increased rates granted by the Railroad Commission of California in 1921. The petition for dismissal of the suit has been heard in the Circuit Court of Appeals.

Referendum in Jacksonville

Voters of Jacksonville, Fla., will decide at a referendum in March whether or not the city will acquire the Jacksonville Traction Company by purchase and then operate the road. A decision to this effect was rendered by the City Council on Dec. 22, 1925, when Councilman P. A. Holt introduced a resolution providing for a vote on the matter that has been agitated for some time.

The Holt resolution refers to "the crowded condition and congestion of the street car traffic" and "the confessed inability of the company to remedy the situation" with the consequent necessity for some definite plan of procedure. One of two plans will be adopted. Either the city will take over and operate the property or a franchise will be granted to the present company or to some other company. The resolution further stated that it would be neces-

sary, if the city decided to take over the property, for the Legislature to pass an enabling act and that it was unfair to delay action until conditions became intolerable.

A Lesson in Safety

A practical demonstration to teach school children how to board and leave street cars safely, was carried on by the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., under the direction of A. W. Koehler, safety engineer of the company, school teachers, street car conductors and motormen. A vestibuled-trailer and a rear-end pay-as-you-enter type of car were both sidetracked near the Shorewood graded schools which were used by all children from the first to the sixth grade to acquaint them in all phases of car safety under the eye of teachers and railway safety engineers. Following blackboard lessons in the classroom, the pupils visited the two sidetracked street cars. Then putting to use the lessons they learned, the youngsters one by one stepped out from the curb, looked each way for approaching automobiles and boarded the car.

Ten Cents Sought in Boise

The Boise Street Car Company, Boise, Idaho, has applied to the Public Utilities Commission for a 10-cent cash fare instead of the 7-cent fare now charged and a ticket rate of 7½ cents instead of one of 5 cents now in force. Increases are also proposed in the cost of tickets issued to school children from the present 2½-cent rate to 4 cents or 25 tickets for \$1. This action follows close upon the heels of the request of the Boise Valley Traction Company for increases on the South Boise and the Boise city belt lines. The increases are identical for both companies.

Two applications were recently presented to the City Council for franchises to operate buses in the city.

Appeal on One-Man Car Ruling in Dayton

Notice of an appeal to the United States Circuit Court of Appeals at Cincinnati was given on Jan. 2 from a decision handed down recently by Judge Smith Hickenlooper in federal district court holding invalid an ordinance adopted by the city of Dayton prohibiting the use of one-man cars. The appeal notice was given by Guy H. Wells, assistant city attorney of Dayton. The case is expected to be heard in March.

The appeal is based upon the claim by the city that the City Commission had a legal right to pass and enforce the ordinance and that the United States District Court had no jurisdiction in the matter. The ordinance barring the one-man car from the streets of Dayton was adopted some months ago following the receipt of petitions from Dayton residents. The City Railway took the matter into federal court and also obtained an injunction restraining enforcement of the ordinance until the courts had passed upon its validity. Reference was made to the recent court decree in the *ELECTRIC RAILWAY JOURNAL*, issue of Dec. 12, 1925, page 1047.

Frankford Line to Be Developed

Plans for the operation of the newly acquired Frankford, Tacony & Holmesburg Street Railway by the Philadelphia Rapid Transit Company, Philadelphia, Pa., were recently announced. The road, which was purchased for \$300,000, is now operating as Route 66. The 7½-cent city fare will be extended on Frankford Avenue by free transfer as far north as Blakiston Street, with a 7½-cent additional charge to the city line.

Users of the line will benefit by the reduced fare. Free transfers will be given between other routes. Tickets of the Frankford, Tacony & Holmesburg Street Railway will not be accepted as fare, but will be redeemed. A bus line has also been put in operation. The fare on the buses will be 10 cents with 3-cent exchange to and from all connecting P.R.T. surface and elevated lines. The old equipment has been superseded with P.R.T. cars and buses. The new project will be financed by the sale of the Philadelphia Rapid Transit Company 7 per cent preferred stock to riders in the Northeast section.

An effort was made on Dec. 29 to block the sale of the Frankford, Tacony & Holmesburg Street Railway to the P.R.T. interests by an application in the Common Pleas Court for the appointment of a receiver for the Northeastern Philadelphia Transit Company, which, at a public sale by receivers on June 19 last, acquired the franchises and property of the Frankford, Tacony & Holmesburg Street Railway for \$350,000. Arrangements were made, however, by agreement between the P.R.T. and the bondholders' protective committee of the Frankford, Tacony & Holmesburg Street Railway to postpone the date of settlement to fifteen days after the final termination of this litigation, but not later than June 30, 1926.

News Notes

Line Offered to Responsible Company.—Representatives of the Chattanooga Traction Company, who recently applied to the Public Service Commission for permission to discontinue service from Asheville to Mayville, N. Y., have offered to turn over all their facilities in that section to any responsible organization which will guarantee to maintain regular service. The proposition was submitted to representatives from the Jamestown Chamber of Commerce.

Will Meet to Discuss Traffic Problems.—A large public meeting for the consideration of traffic and parking problems of the city is the plan of a special committee appointed recently by the Salt Lake City Chamber of Commerce. This meeting will be held at the headquarters of the Chamber of Commerce in that city on Jan. 13. It will be attended by city officials, members of civic organizations, business men and others who are interested in alleviating traffic difficulties in Salt Lake City.

Wages Unchanged.—Carmen and other employees of the South New Orleans and the West New Orleans Light & Traction Company, Algiers, La., have signed an agreement covering wages and working conditions for the next two years, effective Jan. 1, 1926. The wages remain the same. The working conditions have been slightly changed, to the satisfaction of both the carmen and the street car officials.

Franchise Endangered.—The Western Ohio Railway, operating between a number of cities in Hancock, Allen, Mercer, Shelby and Miami counties in Ohio, with a large power plant in St. Mary's, Ohio, may lose its franchise privileges in St. Mary's under a city ordinance. The city administration charges that the company for years has violated stipulations of its franchise in that its tracks have not been kept in conformity to the street grades. Should the cars be barred from St. Mary's streets it would mean discontinuance of interurban service to New Bremen, Minster and Celina.

Fares Now Two Cents a Mile.—Permission was granted recently by the Public Service Commission to the Kaw Valley & Western Railway, an interurban operating between Kansas City and Lawrence, Kan., to make effective on Jan. 1 a schedule of passenger rates based on a charge of 2 cents a mile for one-way passage. The company also was authorized to base round-trip fares on a 3½-cent one-way mileage basis. The schedules will be filed later and formally approved. A short time ago the company received permission from the Public Service Commission to establish a maximum rate of 75 cents for the longest round trip on its line. Prior to that the rate between Lawrence and Kansas City had been 75 cents one way.

Second Edition of P. R. T. Guide.—A second printing of the P. R. T. route guide of trolley, subway-elevated and bus service in Philadelphia, Pa., has been found necessary. Copies are being placed on the cars for sale at 10 cents each. The proceeds from the sale are given to the Helping Hand Fund, used to relieve employees in temporary financial embarrassment.

Tariff of Poughkeepsie-Wappingers Falls Detailed.—The official tariff of changes in fares on the Poughkeepsie & Wappingers Falls Railway, Poughkeepsie, N. Y., referred to in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 12, 1925, page 1049, provides with respect to the Poughkeepsie-Wappingers Falls monthly commutation ticket books as follows: Monthly commutation ticket books with coupons attached equivalent to 52 rides in and between the city of Poughkeepsie and the village of Wappingers Falls will be sold for \$7.80, subject to conditions of sale and use of monthly commutation ticket books. With respect to the Kingwood Park monthly commutation ticket books it provides as follows: Monthly commutation ticket books, with coupons attached, equivalent to 52 rides in and between the city of Poughkeepsie and Kingwood Park, or in and between the village of Wappingers Falls and Kingwood Park, will be sold for \$5.20, subject to conditions of sale and use of monthly ticket books.

Recent Bus Developments

Three Months Test at New Fare on Washington Buses

At a public hearing before the Public Utilities Commission of the District of Columbia on Dec. 30 talk of a merger of all street car and local bus lines was renewed and free universal transfers assumed the proportions of a probability in the near future. The Washington Rapid Transit Company, operating buses and now controlled by the North American Company, volunteered a temporary experimental reduction in fares and asked postponement of consideration of petitions for new bus lines in Sixteenth Street, Northwest.

William McK. Clayton, who had filed the petition for reduction of bus fares from 10 cents cash, five tokens for 45 cents, presented his argument in behalf of the Federation of Citizens' Associations. He said the company could well afford to reduce fares to six rides for 40 cents.

At the conclusion of his remarks the spokesman for the bus concern asked the commission to permit the company to reduce the fares for three months to 10 cents cash, six tokens for 50 cents, and defer further consideration until it was ascertained what income these rates would yield.

Mr. Clayton said he would not object to the sale of three tokens for 25 cents and free transfers at certain points to the lines of both the Washington Railway & Electric Company and the Capital Traction Company. The bus company refused to yield on these points and the commission ruled that its request be granted.

Following the hearing, Lieut.-Col. J. Franklin Bell, engineer commissioner, said:

It may be that the bus company can afford more of a cut in fares. If so, it will be demonstrated during the three months of testing the new rate. I am more interested in free universal transfers between all street car and bus lines. During the three months we will give consideration to that also. I would not be surprised if a definite merger plan were worked out in the meantime.

The commission entered an order effective on Jan. 1 for a period of 90

days authorizing the company to reduce rates to six tokens for 50 cents, the cash fare to remain unchanged. Transfer privileges continue as heretofore.

Method of Accounting for Bus Purchase Specified

In an order made recently authorizing the sale and transfer by Benno Baur of bus certificates and bus equipment on a line between Fort Wayne and Angola and another between Angola and Lake James to the Indiana Service Corporation, operating an interurban electric railway, the Indiana Public Service Commission places definite restrictions regarding the capital account. The order was written by Samuel R. Artman.

Mr. Baur's lines are known as the Northern Indiana Bus Company. The equipment consists of two twelve-passenger automobiles. Mr. Baur's sale price was \$5,000 for the two bus certificates and \$4,000 for the buses. The order said the vehicles are reasonably worth the sum stipulated and that the original cost was \$6,400. Mr. Baur already has set aside, under the commission's orders, \$170.66 in a depreciation fund and has paid out of that sum \$100 in depreciation expenses.

The order authorizing the sale provides specifically that as a part of the sale Mr. Baur shall transfer to the buying concern the balance in the depreciation fund and that the buying concern shall maintain and use it as the law provides in regard to depreciation.

Another provision of the order was that the \$5,000 of the purchase price, which represents the sale price of the certificates, is approved on the express condition that:

The Indiana Service Corporation shall not carry said sum of \$5,000 into its capital account so as directly or indirectly to constitute any part of the value upon which rates of service are to be charged, or so as to constitute any part of the value against which stocks, bonds, notes or other evidences of indebtedness may be issued by said purchaser and upon condition that the said sum shall not be directly or indirectly charged as an operating expense.

Electric railway companies long have become used to depreciation account and to selling bonds to cover the purchase of new equipment. Many of the independent bus operators, however, are expected to contest the decision, especially with regard to the depreciation fund. In case these companies lose in the contest, a revision of bus rates upward is certain to be the result, since it is generally conceded that operators cannot put aside this sum at present fares and continue to operate successfully.

Door-to-Door Service by Illinois Traction

The Illinois Traction System, Peoria, Ill., included in the Illinois Power & Light Corporation, believes that there is a field for freight and express traffic through the medium of motor trucks. The company has been exhibiting in the various cities through which it oper-

Local Licenses Needed in Massachusetts

THE full bench of the Supreme Court of Massachusetts, in three decisions handed down together, has decided it is illegal to transport passengers in buses between points within the Commonwealth of Massachusetts without securing the local license necessary under the statutes, even though the parties operating the buses incidentally do an interstate business. A fourth opinion was that under the criminal law an employee of a bus line may be prosecuted for operating a bus where the owner did not have the statutory licenses.

ates a fleet of 1-ton trucks, built especially for this service. Starting from Springfield on Dec. 26, the fleet made the circle of the various cities on the traction line. After the caravan has appeared in parade formation at all points, there will be a distribution to the various cities according to population and they will be placed in immediate service, picking up freight and express and delivering it to shippers and patrons of all kinds.

Competitive Indiana Bus Lines Seek Higher Fare

The application of the Indiana Red Ball Lines, Inc., for increased rates will be taken up by the Public Service Commission on Jan. 25. It is expected that Clyde H. Jones will preside. The Hoosier Stage Lines, Inc., operating bus lines that connect Indianapolis, Muncie and Marion, has also appealed to the commission for relief in this direction and a hearing will likely be set for some time in February. The company claims that its present rate of 2 cents a mile is inadequate to permit a profit. The company competes with the Union Traction Company. The Red Ball Lines simply asked the commission to authorize an increase which would meet the expenses of operation, taxes, and depreciation and to provide a fair return. The company succeeded the Hiner Red Ball Lines and operates twelve bus lines in Indiana. There has been a steady increase in the number of passengers handled, but an operating deficit will continue to exist, it is argued, until the rates are advanced. Fred I. Jones is receiver for the company. Unless relief is given, it is predicted that a number of the bus lines will be forced to suspend.

Bus Company in Beech Grove Loses Point

A controversy affecting the Beech Grove Traction Company, the citizens of Beech Grove, Ind., and the South Side Motor Coach Company, in which the citizens took sides with the traction company, has resulted in a decision which probably will set a precedent for city regulation of transportation systems. The town board instituted proceedings through a city ordinance to make the coach company keep off streets used by the traction company. The bus company filed proceedings in the Superior Court in Indianapolis to prevent the town board enforcing the ordinance, the constitutionality of which was questioned. The attorneys for the bus company argued that through the certificate granted by the Public Service Commission the company automatically received the right of the streets. Attorneys for the town board argued that the Public Service Commission's authority ended with the granting of the franchise.

The court ruled that the Public Service Commission had exhausted its authority when it granted a certificate to the bus company. The franchise, so the court held, was granted with the understanding that all authority vested in a municipality was not nulled. He said the town was within its right in designating streets for the bus company.

Crosstown Bus Service in Boston Well Patronized

The Boston Elevated Railway, Boston, Mass., has tried out a plan to operate buses between North Station and South Station in Boston on a reduced scale of fares, and has found it to be a paying service, which will be permanent. The single fare is 10 cents, but five tickets are sold for 30 cents.

Additions to rolling stock and further extension of bus routes that will serve downtown districts were outlined by Edward Dana, general manager of the Boston Elevated Railway, in a statement given out on Jan. 5. Double-deck buses are contemplated for the Boylston Street line, and in addition to this popular type of equipment 62 new steel cars will be added for street car lines.

Takes Over Three Lines in Indiana.

—The Indiana Service Corporation has been authorized by the Indiana Public Service Commission to take over the operation of three bus lines running out of Fort Wayne, Ind. The lines purchased are those operating between Fort Wayne and South Bend, between Fort Wayne and Marion and between Fort Wayne and Warsaw. The purchase price of two routes was \$10,500 and the other \$21,000.

Will Ship Freight by Truck.—The Worcester Consolidated Street Railway, Worcester, Mass., in addition to operating buses into Clinton will substitute a fleet of trucks for the freight cars in carrying express and freight parcels between Clinton and Worcester. The old plan was for the trolley freight to deliver and accept shipments at its freight terminal in Clinton. Under the new plan the trucks will call and deliver at the stores and mills. It is reported that the company is planning to purchase its own fleet of trucks for this service and also for similar service in other places, where the trucks will replace trolley freight cars.

Independent Company Favored.—Residents of East Wheeling and those riding buses from North End to East End, in Wheeling, W. Va., will secure a reduced bus fare following the recent action of the City Council in recommending to the State Road Commission the granting of a permit to the Bellaire-Neff Bus Company to operate after the first of the year. The bus subsidiary of the Wheeling Public Service Company, which has been operating for some time, has discontinued. The new company will charge a 5-cent cash fare, with a 4-cent rate by weekly tickets and a 3½-cent fare by monthly tickets. The attitude of the Wheeling Traction Company was that these rates are inadequate.

Buses Started in Place of Cars.—Bus service was substituted for street cars locally in Gulfport, Miss., and between Gulfport and Pass Christian on Jan. 1 by the Mississippi Power Company, which controls the Gulfport & Mississippi Coast Traction Company. The street cars still operate between Gulfport and Biloxi. Buses replace the cars with a fifteen-minute service on the Gulfport City line and 30-minute service on the lines to Long Beach and

Pass Christian. No change has been made in fares. The stop system is similar to that previously maintained by the railway. Railway employees were trained as bus drivers since the bus equipment arrived last fall.

In Command of Bus Operations.—Peter J. Calderone has transferred his ownership of eight bus lines operating between the Pawtucket Valley and Providence, R. I., to the United Electric Railways, and the latter company has now gained full control of motor operations in that section. Permission has been granted the company to combine the eight certificates into one. Mr. Calderone only recently purchased the eight bus lines from eight individual owners. The transfer of the bus properties to the railway was concluded on Dec. 28.

Opposes Motor Line.—Protests have been filed with the Ohio Public Utilities Commission by the Lake Shore Electric Railway, Cleveland, and the Northern Ohio Traction & Light Company, Akron, against the application of the Motor Freight, Inc., Detroit, for a certificate to operate motor trucks between Detroit and Akron, via Toledo and Cleveland. Both protests charge that the proposed motor line would be in direct competition with established electric lines.

Bus Fare Lowered.—The Washington Railway & Electric Company, Washington, D. C., has been authorized by the Public Utilities Commission to reduce the rate of fare on its Rhode Island Avenue bus line to six tokens for 50 cents, the cash fare to remain the same. The company is also ordered to give free transfers which will be good on any intersecting car or bus line of the Washington Railway & Electric Company or any intersecting car line of the Capital Traction Company, on payment of a 10-cent cash fare or payment of one ticket or token and 2 cents.

Bus Transactions to Be Concluded.—Arthur W. Brady, receiver of the Union Traction Company of Indiana, has been authorized by the Circuit Court at Anderson, Ind., to complete a recent transaction by which the company and the Indiana Service Company contracted to buy eight buses of the Interstate Safety Motor Coach Company, operating between Indianapolis and Peru and Fort Wayne. In the receiver's petition for authority, it was said that the Union Traction would pay \$54,395 for five of the buses and the Indiana Service Company would pay \$25,695 for three buses. The Union Traction will operate between Peru and Indianapolis and the other company between Peru and Fort Wayne.

So-Called Reading Case Continued.—After an all-day hearing on Jan. 6 before the Public Service Commission of Pennsylvania the so-called Reading case was continued for two weeks in order to permit the introduction of additional data. In this proceeding the electric railways are opposing the proposal of the Reading Railroad through its subsidiary, the Reading Transportation Company, to operate buses parallel to the existing electric railways and bus lines in Schuylkill County, Pennsylvania. This case was referred to in the JOURNAL for Dec. 19, page 1092.

Financial and Corporate

Kansas City Road Sold

Property Purchased by Attorney Representing Committee Acting for First Mortgage Holders

All the properties of the Kansas City Railways, Kansas City, Mo., were bid in at the foreclosure sale of the company's assets on Jan. 4 by P. C. Groner, Chicago attorney, acting in behalf of the reorganization committee. The Missouri and the Kansas properties of the company were first offered for sale separately by John T. Harding, special master commissioner, but Mr. Groner, the only bidder, was silent until the properties were offered as a whole, when he entered a bid of \$8,000,000 for the property in its entirety.

Mr. Harding expressed the intention of reporting the sale promptly to Judge Kimbrough Stone, referee, before whom it must come for confirmation in the federal court. Upon its confirmation, the sale will eliminate all interest in the Kansas City Railways of J. Ogden Armour, for many years a dominant figure in the railway, as well as the other remaining stockholders of the old organization.

Approximately \$47,000,000 in liens against the property are said to have interposed between Mr. Armour's stock and his possession of the property. In claims presented in behalf of Mr. Armour no mention had been made of the stock held by him in the old organization, but he made several attempts to collect approximately \$2,000,000 for funds which he is said to have personally advanced the company shortly before the receivership.

Blatchford Downing, attorney for the second mortgage bond holders, was an observer of the foreclosure sale. The second mortgage bond holders have so far been left entirely out of the reorganization plan, having first refused an offer of five shares of stock for each \$1,000 in second mortgage bonds held in the old company and, later, refused an offer of 20 cents on the dollar as a cash compromise. Mr. Downing did not contest the court's final order of foreclosure, but he indicated last May that he would press the contentions of his clients when the sale comes before Judge Kimbrough Stone for the necessary confirmation. In the meantime Francis M. Wilson and Fred W. Fleming, the receivers, will remain in charge of the property.

In qualifying himself as a bidder Mr. Groner presented Mr. Harding, special master, with certificates conveying a total of \$854,000 in first mortgage liens on the railway property as a bond binding the sale.

In his preliminary explanation of the bid Mr. Groner said a nominal bid of \$8,000,000 was made as representing the approximate present market price of the first lien securities. He said the postponement of the sale at his request from Dec. 15 had resulted in deposits by the first mortgage bond and note

holders of an additional \$150,000 in bonds.

In presenting the bid Mr. Groner said he represented more than 7,000 holders of first mortgage notes and bonds, owning more than 96 per cent of all the first liens against the property. He also announced that other holders of

first liens could deposit their securities at any time up to the day of the court's confirmation of the sale.

The receivers are said to have more than \$4,500,000 in their treasury, invested in government bonds. It is said that Mr. Harding will report the presence of these funds to Judge Stone at the time he reports the bid of \$8,000,000 for the court's confirmation.

Mr. Groner is attorney for the Newman-Woolfolk interests. He is quoted as saying that the cash left in the company's treasury will be utilized for improvements.

Significant Tax Suit

Discrimination Charged by Akron Company—Uniformity Sought in Method of Assessment—Temporary Injunction Served

COUNTY treasurers of Summit, Stark, Portage, Medina, Tuscarawas, Cuyahoga, Wayne and Noble Counties—all the counties through which the Northern Ohio Traction & Light Company operates—have been served with a temporary order from the federal court of the northern district of Ohio restraining them from collecting taxes assessed against the company for 1925. The company's taxes are fixed by the state commission. The temporary order follows the filing of a suit by the company against the counties named to secure a reduction in taxes. The contention is that the property of the company is not assessed upon the same basis as other property in Ohio. The suit is the first of its kind brought by a public utility in Ohio and probably the United States.

The company declares that, because real estate valuations in general are too low, it is forced to pay taxes proportionately too high. Prior to March 1, 1925, the company filed with the Tax Commission its verified annual report as prescribed by the commission and that the commission placed a tentative value of \$27,061,180 upon the property. The company applied for a hearing before the commission, but could get no reduction. The apportionment was made and taxes aggregating \$750,000 were assessed.

The company says:

For many years there has been in the respective counties a systematic general undervaluation of real estate for the purpose of taxation; that in the years 1924 and 1925 the average tax valuation of real estate in said counties would not exceed 45 per cent of the true valuation of said real estate; that there has been no reappraisal of real estate in many of said counties for many years, during which time the aggregate value of real estate in said counties has enormously increased; that the Board of Commissioners of said respective counties and the State Tax Commission have refused and neglected to increase and readjust the assessments of said property on the tax duplicates of said counties or to cause a proper reappraisal to be made thereof, although being fully advised of the undervaluation and inequalities as aforesaid, but have knowingly and systematically permitted said condition to continue and grow worse from year to year; that as a result of the failure of said taxing boards to adopt and follow a uniform rule in assessing the property of the plaintiff and other property in said state and said counties, and the systematic and general undervaluation of other property in said counties, the tax rate in said respective counties for the year 1925 is much higher than would have been required to produce the same revenue if the real estate therein had been assessed at its true valuation in money as required by law, and this plaintiff has been discriminated against, is denied the equal

protection of the laws and is about to be deprived of its property without due process of law, in violation of the Fourteenth Amendment to the Constitution of the United States and in violation of the Constitution and laws of the State of Ohio, providing that property should be taxed at its true value in money by a uniform rule.

The company says further:

The said several defendants, as county treasurers, are each severally demanding the payment of the whole tax shown by each county tax duplicate, the first half of which was due Dec. 20, 1925, and are intending and threatening to enforce and will enforce the collection of the whole amount of tax shown by said tax duplicates respectively, including the amount unlawfully assessed as well as the amount lawfully due, and to impose penalties upon the plaintiff upon the amount of tax assessed, and to sell plaintiff's property at tax sale, or else to distrain plaintiff's property therefor, to the great and irreparable injury of the plaintiff, and the plaintiff will be subjected to a multiplicity of vexatious suits and prosecutions, and also subjected to an illegal lien and a cloud upon the title to its property within the state.

The company says that it is ready and willing to pay the tax levied against it in the amount which would have been assessed against it if its property had been assessed by a uniform rule along with other taxable property, and that, on ascertainment by the court of the true amounts of tax lawfully due from it in each county, it offers to pay any such lawful tax as a condition of its relief in the premises.

A. C. Blinn, vice-president and general manager of the company, says that the company has no desire or inclination to evade its just share of the tax burden. The law of Ohio provides that all property shall be taxed by a uniform rule, and it is the contention of the company, Mr. Blinn says, that the Tax Commission of Ohio does not tax its property by the same method and on the same basis as other property is taxed.

\$304,704 Refunded by Pittsburgh Receivers

The final report of C. A. Fagan, S. L. Tone and W. G. George, former receivers for the Pittsburgh Railways, Pittsburgh, Pa., subsidiary of the Philadelphia Company, has been filed in the federal court, showing a balance of \$304,704 to be refunded to the company. The receivership was lifted on Jan. 30, 1924. The court at that time ordered that \$500,000 be left in the control of the receivers to satisfy outstanding claims.

Merger in Williamsport

Four traction companies operating over the streets in Williamsport, Pa., and vicinity will be merged to form the Williamsport Railways following the passing of an ordinance by the City Council providing for such amalgamation. Traction company problems have been before the City Council for the past six months and the Mayor some time ago named a committee of citizens to make a report. This amalgamation follows the report. The companies merged are the Vallamont Traction Company, East End Passenger Railway, South Side Passenger Railway and the Williamsport Passenger Railway.

The final details of the merger will not be consummated for at least two months due to legal acts necessary. A straight 10-cent fare will be asked effective within 30 days. The new company plans to modernize the system.

Mount Manitou Road Not Sold.—The Mount Manitou Park & Incline Railway, Colorado Springs, Col., has not been sold at sheriff's sale, as reported in the *ELECTRIC RAILWAY JOURNAL*, issue of Aug. 8, page 233, nor should it have been included in the receivership table in the issue of Jan. 2, 1926, page 43. The road is a success financially.

Car Trusts of Gary Railways Offered.—An issue of \$350,000 of 5½ per cent equipment trust certificates of the Gary Railways, Gary, Ind., is being offered by Halsey, Stuart & Company, New York. The notes, which are issued under the Philadelphia plan, are priced to yield from 5.50 per cent to 6 per cent, according to maturities.

Worcester Board Increased.—W. E. McGregor of Harris, Forbes & Company, New York, bankers, has been elected a director of the Worcester Consolidated Street Railway, Worcester, Mass. His election increased the board to nine members.

Seeks Abandonment Permission.—The Depew & Lancaster Railway Corporation, connecting Cheektowaga, Depew and Lancaster, applied on Dec. 28 to the Public Service Commission for approval of a declaration of abandonment. The company alleges that the road has operated at a loss ever since it was placed in operation in 1921 and that the deficit incurred in such operation now amounts to approximately \$60,000; that up to Sept. 30, 1925, unpaid interest accrued on a first mortgage bond issue of \$110,000, amounting to \$27,625. The stockholders and directors of the company on Dec. 28 voted to take the necessary steps to abandon the 12-mile road.

\$6,000,000 Illinois Power Issue Offered.—The Illinois Power & Light Corporation, Chicago, Ill., on Dec. 29 placed with the investing public an issue of \$6,000,000 of first and refunding mortgage 5½ per cent gold bonds, series B, due in 1954. The bonds were offered by E. H. Rollins & Sons, Harris, Forbes & Company, Halsey, Stuart & Company, Inc., Spencer Trask & Company, Marshall Field, Glore, Ward & Company, and Blyth, Witter & Company, at a price of 99 and interest, to yield over 5.50 per cent. Proceeds

of the bond issue are to be used to reimburse the company for extensions and betterments and to retire \$2,596,800 of the underlying bonds.

Interstate to Issue Securities.—Following a conference of members of the Indiana Public Service Commission and officers of the Interstate Public Service Company, Indianapolis, Ind., it was learned the company soon will ask the commission for authority to sell securities of approximately \$1,000,000 to \$1,500,000 to provide the company with more working capital.

Wisconsin Bonds Offered.—Hill, Joiner & Company, Halsey, Stuart & Company, Inc., and Paine, Webber & Company are offering at 98½ and interest to yield about 5.60 per cent \$1,200,000 first lien and refunding mortgage 5½ per cent gold bonds of the Wisconsin Power & Light Company, Oshkosh, Wis., known as Series D. The bonds are dated Dec. 1, 1925, and are due Dec. 1, 1955. The proceeds will be used for additional property required, for expenditures made and to be made for additions and for other corporate purposes.

Legal Notes

CALIFORNIA—Use of Highways by Private Carriers under Jurisdiction of Legislature.

A truck company had entered into a purported lease with an orange growers' association to supply certain trucks to be used in the transportation of fruit, but the trucks were to be operated by the truck company. This was held to bring the trucks so operated under the Auto Stage and Transportation Act which covered the use of buses, auto trucks, etc., "in the business of transportation of persons or property for compensation," as well as common carriers. The act mentioned forbids the use of public highways to any such carrier, except under certain conditions, one of which is that it must obtain from the Railroad Commission a certificate of convenience and necessity. Another clause empowers the commission to fix rates for such service. It was held that the Legislature could not transform the private carrier to a common carrier, but that the act did not do this. The privilege of using the public highways as a place for the transaction of business is not a vested right, but a privilege which the state may grant or withhold at its pleasure, and if it grants this permission, it may do so upon such terms and conditions as it may see fit to impose. A distinction was drawn between the case at court and that of Michigan Public Utilities Commission v. Duke, in that in the latter case, Duke was operating under contract existing before and at the time of the enactment of the Michigan statute, whereas in the case at court, the contract was not made until after the passage of the California statute. The truck company was not obliged to submit to the conditions imposed by it, but if it used the public highways, it should be deemed to have thereby consented to the conditions prescribed by the Legislature. [Frost et al. vs. Railroad Commission of California et al., 240 Pacific Rep., 26.]

KENTUCKY—Degree of Ability to Stop Car defined.

Expert evidence as to the distance within which an electric car could have been stopped is insufficient to contradict the established physical fact that the car did not stop within such distance, in view of the evidence as to

what was done to stop it. The company is not necessarily liable for damages if the motorman failed in some degree to exercise the utmost care possible by immediately comprehending the whole situation when a person is in peril and loses not a second in the performance of every duty imposed upon him by the sudden emergency. Such presence of mind and efficiency are not possessed by ordinary men, nor available to the defendant; hence, the plaintiff is not entitled to protection in that extreme degree. [Kentucky Traction & Terminal Co. vs. Brackett, 276 Southwest. Rep., 828.]

MISSOURI—Neglect in Allowing a Ground to Remain on a Transmission Pole Makes Company Liable for Injury to Lineman.

Attached to a pole carrying high-voltage wires was a guy wire used to maintain in position the smokestack of a neighboring building. The guy wire was attached to the pole with the consent of the railway company. A lineman, not knowing this guy wire was grounded, stood on it while altering the transmission wires and received a fatal shock. The railway company, the owners of the stack, and the contractor for its erection were held jointly responsible. [Smith vs. St. Joseph R. L. H. & P. Co., 276 Southwest. Rep., 607.]

TEXAS—Carrier Owes Duty to Passenger to See that Aisle Is Not Obstructed When Passenger Is Alighting from Car.

A woman passenger on a crowded one-man car was injured while going to the front of a car to alight by stumbling over a suitcase left in the aisle by another passenger. The court held that the high degree of care which a carrier owes to its passengers may in law include the duty to see that the aisle of its car is not obstructed by a large suitcase over which a passenger is likely to stumble and fall, especially at the time when the car is stopped for this passenger to alight. In consequence, the issue of negligence in this case should have been submitted to the jury. The court said that the negligence alleged does not depend on knowledge of the presence of the obstruction, but on failure to use care to prevent the obstruction being placed in the aisle. [Houston Electric Co. vs. Bagg, 276 Southwest. Rep., 641.]

Personal Items

Messrs. Sawyer and Eales Go Abroad

First Vice-President of American Electric Railway Association Chosen to Report to Australian Government

Two American engineers, W. H. Sawyer, East St. Louis, and H. W. Eales, St. Louis, both of whom occupy prominent places in the electrical industry of the United States, will sail for Australia on Feb. 2 to make a survey of electric power resources in the Antipodes. Announcement to this effect



W. H. Sawyer

was made on Jan. 6 by Sir James Elder, Commissioner for Australia in the United States of America.

Officially Messrs. Sawyer and Eales have been appointed by the government of the State of Victoria, through the Prime Minister's Department of the Commonwealth of Australia, to "investigate and report on the Yallourn brown coal electricity generation scheme and connected power undertakings of the government electricity commission." Actually, however, these men have been summoned to Australia to place the benefit of America's electrical experience at the disposal of a country which aspires to change from a mere producer of raw materials to a completely self-contained nation, a nation quite capable of supporting itself.

Mr. Sawyer, an executive engineer, is president of the East St. Louis & Suburban Railway Company, East St. Louis, Ill., and an officer of other properties controlled by the North American Company and is first vice-president of the American Electric Railway Association. Mr. Eales, who goes to Australia as his assistant, is a regional vice-president in the American Institute of Electrical Engineers and is active in National Electric Light Association work. Both Mr. Sawyer and Mr. Eales are undertaking the mission to Australia on extended leaves of absence from their duties in the North American system.

With an area almost as large as the

United States, with a population of nearly 6,000,000, and with natural resources so abundant and so varied that it produces all essentials of an economic independence, Australia finds itself chiefly engaged in producing raw materials for other countries to manufacture into finished products. What Australia needs is development of its electric power resources so that it can manufacture the materials which it produces. Because the government there believes that the United States is far ahead of other nations in backing up its man-power with motive power, it came to America for the men best qualified to tell it how to develop electric plants and how to use them.

The chief problem faced by Australia and by the two American electrical experts is how to make efficient use for electric generation of enormous quantities of "brown coal," a low-grade fuel of somewhat lesser quality than the American lignite. This coal contains from 60 to 65 per cent moisture, and if means are found whereby it can be dried out for use in steam-electric generation a great stride will be accomplished toward providing Australia with an abundance of cheap electricity.

The Victorian Electricity Commission has already spent more than \$30,000,000 in generating plants and distribution system, and before embarking upon a wider field to stimulate the use of electricity it desired the best information obtainable, with recommendations for future development. It is generally understood that in selecting American engineers for this work the government not only appreciated the advances made by the American electrical industry but desired the appointments to be regarded as an international compliment to the United States.

W. A. Seten Commercial Manager at Wheeling

W. A. Seten, Pittsburgh, has been appointed commercial manager of the Wheeling Traction Company, Wheeling, W. Va. He will succeed J. E. Alberts, former assistant general manager, who recently resigned to accept an offer from the Public Service Railway, Newark, N. J. This announcement was made by A. C. Spurr, general manager of the local company. Mr. Seten began his duties on Jan. 4. For the last few years he has been connected with the J. G. White Corporation, New York City. He has also been connected with the Manila Electric Company in the Philippine Islands in charge of the transportation department.

The commercial department, of which Mr. Seten will be manager, has been created by the Wheeling Traction Company in place of the assistant general managership. The duties of the office require that the head of the department concern himself with the quantity and the quality of the service, complaints from the general public and

the advertising end of the railway business. He will also assist the general manager.

G. B. Powell Superintendent at Louisville—Other Changes

Changes in the personnel of its transportation department have been announced by the Louisville Railway, Louisville, Ky., incidental to the reorganization of the department following the death of Anthony F. Connelly after 50 years of service.

G. B. Powell has been appointed superintendent of transportation of the company. Mr. Powell was employed by the company from August, 1904, to September, 1906, as trainman; from September, 1906, to March, 1910, as carhouse foreman; from March, 1910, to February, 1920, as superintendent of



G. B. Powell

employment and schedules; from February, 1920, to December, 1925, as assistant general superintendent, and on Dec. 15, 1925, he was appointed to his present position of superintendent of transportation.

Albert E. Nelson has been appointed assistant superintendent of transportation. He was employed from October, 1910, to February, 1912, as trainman; from February, 1912, to January, 1920, as carhouse foreman; from January, 1920, to December, 1925, as transportation clerk, and on Dec. 15, 1925, he was appointed to his present position as assistant superintendent of transportation.

Ernest B. Ellingsworth has been appointed assistant superintendent of transportation. He was employed from August, 1898, to February, 1905, as trainman; from February, 1905, to December, 1925, as carhouse foreman, and on Dec. 15, 1925, he was appointed to his present position as assistant superintendent.

B. H. Williams has been appointed chief inspector. He was employed from August, 1887, to January, 1890, as trainman; from January, 1890, to June, 1907, as carhouse foreman; from June, 1907, to December, 1925, as inspector, and on Dec. 15, 1925, he was appointed to his present position as chief inspector.

Frank Raschig, who has been executive secretary and principal assistant engineer of the Cincinnati Rapid

Transit Commission, Cincinnati, Ohio, has been appointed chief engineer of the commission to succeed Frank S. Krug, who resigned to practice for himself in the field of engineering.

Changes on B.-M. T.— James Addison Comptroller

James Addison was elected comptroller of the Brooklyn-Manhattan Transit System, Brooklyn, N. Y., to succeed the late Howard Abel at the meeting of the board of directors on Dec. 21, 1925.

A. P. Clausonthue will continue as assistant comptroller.

De Forest P. Rudd, who has been with the system for some years, was made an additional assistant comptroller.

Mr. Addison came to the United



James Addison

States from England in 1902 and for two years was associated with the accounting firm of Patterson, Teele & Dennis, New York. He then became auditor of the Eaton, Crane & Pike Company, Pittsfield, Mass., where he remained eight years. Mr. Addison next was appointed auditor of the Franklin Railway Supply Company and its affiliated organizations. This position he occupied until January, 1918, when he was elected comptroller of the National City Bank, New York. Mr. Addison remained with the National City Bank for five years. During the past few years he has been practising public accounting and recently he had been engaged on special work for Patterson, Teele & Dennis, the firm with which he was first associated after coming to the United States.

The new comptroller was born in Leith, Scotland. He was educated at Edinburgh, attending Heriot Watt College and taking special courses at Edinburgh University to prepare himself for a business career. His training as an accountant was obtained in Edinburgh and also at New Castle-on-Tyne and Huddersfield, England. He is a vice-president of the Garden City Bank and a member of the American Institute of Accountants, the Garden City Country Club and Crescent Lodge, F. and A. M.

Frank S. Krug has resigned as chief engineer of the Cincinnati Rapid Transit Commission, Cincinnati, Ohio.

Mr. Krug said that since only a few months more work was needed to place the line in operation he felt that his services were no longer needed. Mr. Krug also tendered his resignation as city engineer. Before being appointed city engineer he was secretary of the Frank H. Kirchner Construction Company. Prior to that he had been county engineer for a number of years. Mr. Krug plans to go into the private practice of engineering.

C. O. W. Weidman at Altoona— Other Changes

Claude O. Weidman, Newark, N. J., formerly superintendent of the Morris County Traction Company, Morristown, N. J., has assumed the duties as superintendent of transportation for the Altoona & Logan Valley Electric Railway, Altoona. He succeeds John R. Condo, resigned.

Mr. Weidman has served electric railways for more than twenty years. He began his work with the Southern New York Railway & Power Company and then went to Morristown, N. J., where he remained for eleven years.

G. S. W. Brubaker has taken the position as engineer of maintenance and construction at Altoona, succeeding Frank D. Hain, resigned.

Mr. Brubaker has been engaged in rebuilding work for many years with the American railways. He rebuilt the lines at Chester, Wilmington, Darby and other Eastern points.

John R. Condo, superintendent, who resigned, served the Logan Valley since 1917, succeeding Lee T. Shannon, now general manager of the Johnstown Traction Company.

Frank D. Hain, engineer, who resigned, served the company for twelve years, having a leave of absence for two years to serve as engineer for the city of Altoona.

H. D. Bercaw Akron Property's Southern Division Manager

Henry D. Bercaw, who has been claim agent of the Northern Ohio Traction & Light Company at Canton, Ohio, for the last five years, has been appointed manager of the Canton and Massillon systems of the company as well as the company's interurban lines south of Akron. He is given full authority to handle all company matters, both city and interurban, pertaining to the Southern Division. Mr. Bercaw assumed his new duties Jan. 1. He has been with the company seven years.

In announcing the appointment, A. C. Blinn, vice-president and general manager of the entire property, said that the company had felt for some time that the industrial and commercial development of Canton demanded a local resident manager. "Canton has witnessed a splendid and remarkable growth during the last few years," he said, "while many other cities were marking time. It is partly in recognition of this, and partly because the city's transportation needs development, that the company has selected Mr. Bercaw as manager."

Mr. Bercaw has a large following among those interested in civic affairs.

H. L. Andrews Advanced by General Electric

H. L. Andrews has recently been appointed assistant engineer of the railway engineering department of the General Electric Company, in administrative charge of the department. For some time he has been in charge of car equipment work in that department. In this capacity he has been identified with all the large railway equipment propositions that have come up in the last few years and in that way has built up a wide acquaintance in the electric railway operating field, to the members of which his advancement will be pleasing. This position will enable Mr. Andrews to use to better advantage his boundless energies and executive ability under W. B. Potter, who for many years has



H. L. Andrews

been chief engineer of the railway department.

Mr. Andrews was born in Boonville, Mo., in 1889. He was graduated from the University of Missouri in 1910 with the degree of B.S. in E.E. He entered the testing department of the General Electric Company, Schenectady Works, in August, 1910. In May, 1912, he was transferred to the railway motor department and four years later, 1916, to the railway engineering department, one year later being placed in charge of car equipment work.

Obituary

Dr. Karl Goldschmidt

Dr. Karl Goldschmidt, head of Th. Goldschmidt A. G. of Essen, Germany, died on Jan. 4. Dr. Goldschmidt was approaching his 70th year. He had long been prominent in the business and scientific world, both here and abroad, not only as the active head of Th. Goldschmidt A. G., but also on account of extensive chemical research and development work, particularly in connection with processes for the detinning of scrap tin plate, upon which subject he was regarded as a recognized authority.

In partnership with his younger brother, the late Prof. Hans Goldschmidt, inventor of the well-known thermit process, who died in the early

part of 1923. Dr. Karl Goldschmidt carried on the enterprise founded by his father and brought it to its present dominant position among German industries. He was also one of the founders and original directors of the Goldschmidt Detinning Company, now the Metal & Thermit Corporation, New York City.

Endowed with rare vision and energy, Dr. Goldschmidt took an active interest in the welfare of his employees, being instrumental in the establishment of old age and invalid pensions from which workmen with more than ten years of service were entitled to relief. From his own means he also set aside a large sum for the establishment of a suitable home for those of his employees who after illness might need a quiet place at which to rest and recuperate. Dr. Goldschmidt's eldest son, Dr. Theodore Goldschmidt, succeeds his father as active head of the German firm.

John A. Rigg

John A. Rigg, president of the Interstate Railways, Camden, N. J., died on Jan. 2 at his apartment in the Longacre Hotel, Philadelphia. He was in his seventy-first year. Death was said to be due to apoplexy.

Mr. Rigg was born at Gibraltar, Berks County, Pa., on Feb. 14, 1854. At the age of fifteen he quit the farm and went to Reading, where he began his career as an iron puddler. Three years later he took a position with the local railway as a conductor. In 1874 he was promoted to superintendent, and continued in the service of the Reading City Passenger Railway until 1892, when he became the general manager of the People's Passenger Railway, Philadelphia.

In this latter connection Mr. Rigg gathered about him able business associates and organized the Reading Traction Company, which leased and consolidated the street railways of Reading, also the Metropolitan Electric Company, which manages the Reading Electric Light, Heat & Power Company, and the Neversink Electric Light, Heat & Power Company, controlling the electric lighting business of Reading.

Mr. Rigg was also instrumental in forming the United Power & Transportation Company, most of the stock of which is controlled by the Interstate Railways. He was an officer and director of subsidiaries of both of these companies, among them the Trenton Street Railway, operated under lease by the Trenton & Mercer County Traction Corporation; the Delaware County & Philadelphia Electric Railway, the Media, Glen Riddle & Richdale Electric Railway, the Wilkesbarre & Wyoming Valley Traction Company, which is leased to the Wilkesbarre Railway, and the Wilmington & Chester Traction.

B. H. Ryder of the American Steel & Wire Company died on Dec. 26. He went with the American Steel & Wire Company more than twenty years ago, entering the electric wire and cable department. With the exception of a short connection with the Pittsburgh office of the company about seven years ago, his activities were carried on almost entirely in the West, with Chicago as his headquarters.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Striking Comment by Victor Angerer

Prominent Manufacturer Sounds Key-note in Question of Parts Manufacture by Railways

Out of the turmoil of discussion which centers about the question of parts manufacture by operating companies may come a definite understanding as to the presence or absence of economies involved in this practice. For the time, however, opinion continues divided, although the weight of numbers seems to be considerably against the practice. Established manufacturers of electric railway equipment might naturally be expected to view the matter from the point of its possible effect upon them, nevertheless some very illuminating comments frequently are obtained from this quarter.

An example of this appears in a recent communication received from Victor Angerer, vice-president William Wharton, Jr. & Company, Inc., Easton, Pa. Mr. Angerer feels very keenly on the subject and has given considerable thought to the various aspects of the problem. While the William Wharton Company, because of the highly specialized nature of its product, is probably less affected than other manufacturers by this recently evidenced tendency on the part of some operating companies, nevertheless Mr. Angerer is much interested in the principle involved.

He mentioned the present discussion concerning the growth of this practice among steam railroads, particularly a number of addresses given at the recent annual meeting of the Railway Business Association on the subject. He then asked if the criticism advanced concerning the mutual relations co-operation between manufacturers and railroads in this field were not also applicable to the electric railway field. He went on to say:

Hasn't the period of retrenchment and repairs, instead of renewal of equipment, etc., led a number of operating companies to extend the work of their auxiliary shops

into what can be done better and more economically by and purchased from the specially equipped manufacturer? From what we know, this practice or tendency of the railroad and the railway doing some manufacturing of their own material requirements has affected nearly all lines of supplies to the railroads and the railway lines. Is there any true economy in this to the operating companies?

It is of course well known that the larger manufacturers annually expend much money in research and in developing new materials for railway use. Naturally this policy is not followed purely from a spirit of philanthropy. The manufacturers expect a fair return on this investment from sales of materials thus developed. Operating companies quite obviously cannot afford to expend a great deal of capital in this direction, and if the manufacturer is discouraged from continuing his research program because of what he considers unwarranted competition on the part of his erstwhile customers the industry as a whole is bound to suffer.

MATTER SHOULD BE THRESHED OUT

Mr. Angerer states his hope that the whole subject will be carefully studied and threshed out between the managers of the operating companies and the manufacturers of the various lines of supplies and equipment. He looks for a greater degree of co-operation between the parties involved.

As for the outlook for special trackwork in the future, Mr. Angerer says:

We manufacturers appreciate the conditions which compelled the electric railways to disregard ultimate economy and follow a policy of restricting the immediate outlay of money by making all possible temporary repairs instead of the purchasing of new materials. The improved condition of the electric railways, however, gives us hope for the future—we might say the immediate future. It is, of course, only natural that expenditures for improvements are directed first to the cars and other equipment and that track comes last. While, therefore, manufacturers of such other equipment have already felt the greater activities, special trackwork manufacturers still are looking to the future.

In speaking of competition between traction companies and independent bus lines, he says:

The bus does not scare us. Maybe it will help by hastening the necessary improvements in the condition of the track of the railway lines and the betterment of the high-class cars and to satisfy the public, who believe that they see some advantages in the comfortable seats and rubber-tired wheels of the bus, but who, we are assured, would not want to be without the railway lines and could not be without them.

Mr. Angerer realizes that the railway manager must heed the demand for his customers, the public, for better cars, more cars, smoother riding and less noise in operation. To satisfy these demands and at the same time preserve the new rolling stock, higher degree of maintenance of the track must necessarily follow. Ultimate economy in the maintenance should also call for renewals of the worn special trackwork in preference to frequent temporary repairs. All these factors together make the manufacturers opti-

Metal, Coal and Material Prices

Metals—New York		Jan. 5, 1926
Copper, electrolytic, cents per lb.	14.125	
Copper wire base, cents per lb.	16.00	
Lead, cents per lb.	9.25	
Zinc, cents per lb.	8.90	
Tin, Straits, cents per lb.	63.25	
Bituminous Coal f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	\$4.625	
Somerset mine run, Boston, net tons	2.10	
Pittsburgh mine run, Pittsburgh, net tons	2.05	
Franklin, Ill., screenings, Chicago, net tons	1.875	
Central, Ill., screenings, Chicago, net tons	1.425	
Kansas screenings, Kansas City, net tons	2.30	
Materials		
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	\$7.00	
Weatherproof wire base, N. Y., cents per lb.	18.25	
Cement, Chicago net prices, without bags	2.10	
Lined oil (5-bbl. lots), N. Y., per gal.	0.225	
White lead in oil (100-lb. keg), N. Y., cents per lb.	0.1550	
Turpentine (bbl. lots), N. Y., per gal.	\$1.125	

mistic regarding the coming business in the line of special trackwork, he added.

Officers for American Car & Foundry Motors Announced

The American Car & Foundry Motors Company, which was recently organized to take over control of the Hall-Scott Motor Car Company, Berkeley, Cal., and Fageol Motors Company, Kent, Ohio, on Jan. 6 announced that W. H. Woodin had been named chairman of the board of directors and C. S. Sale president.

Col. E. J. Hall, one of the co-designers of the Liberty airplane engine, was made a vice-president, together with Horace Hager, L. Stancliffe, G. R. Scanlan and F. R. Fageol. H. C. Wick is secretary and S. A. Mallette treasurer.

The J. G. Brill Company, Philadelphia, builder of electric railway cars, through its interest in the Hall-Scott and Fageol companies, is represented on the board of directors by S. M. Curwen, its president.

Successor to Kelly-Springfield to Build Buses

Sale of the plant, equipment and material on hand of the Kelly-Springfield Truck Company to the American Bus & Truck Company, a Delaware corporation, has been confirmed by Judge Frank M. Krapp of Common Pleas Court, by whose orders the receiver of the Kelly company, Pearl A. Lewis, offered the property for sale. The new owners plan to expand the activities of the corporation. Edward L. White, New York, representing the American company, will remain in Springfield to assume charge of the plant. He said the company will add a line of buses to be manufactured under foreign patents and that these will all be produced at the Springfield plant. The Kelly-Springfield company did not manufacture buses, but it frequently provided chassis on special bus orders.

W. J. Overman With Fageol— D. P. Knight Succeeds Him

W. J. Overman has resigned as engineer of the railway, department of the Boston office General Electric Company to accept a position with the Fageol Company, 120 Broadway, New York, builder of buses. Mr. Overman will specialize in the application of the electric drive in his new work. He was graduated from the Virginia Polytechnic Institute and has been with the General Electric Company for fifteen years, including service on the test and at the Schenectady works for eight years.

Donald P. Knight has become associated with the Boston office of the General Electric Company as engineer for the railway department. He was graduated from the Massachusetts Institute of Technology three years ago and has since been engaged on the Schenectady test and in railway motor work.

More Gas-Electric Cars

New Haven Railroad Orders Five of
Type Demonstrated Recently by
Brill and Westinghouse

An interesting demonstration of the recently developed Brill-Westinghouse gasoline-electric rail car was made on Jan. 5 over some of the lines of the Pennsylvania Railroad near Philadelphia. The particular car used was of 250 hp., and was one of the three units of this type delivered to the Pennsylvania Railroad this week for use in Indiana.

It is worthy of note that an order for five of these cars has just been placed with the J. G. Brill Company, Philadelphia, and the Westinghouse Electric & Manufacturing Company, by the New York, New Haven & Hartford Railroad. This brings the total number of units sold or contracted for to twenty. During the demonstration run a distance of approximately 60 miles was covered by the car, with its load of railroad and manufacturing officials, newspaper men and representatives of trade journals. Particularly noticeable as operating characteristics of this new equipment were the smoothness of operation and acceleration and the facility with which the car could be handled. Noticeable, too, was the attention which had been

Three cars each have been ordered by the Erie Railroad, the Boston & Maine, the New York, Ontario & Western Railway, and the Pennsylvania Railroad. The Reading Company, the American Car Company, and the Great Northern Railway each have single cars which are being used for trial and demonstration purposes.

Seats for 61 passengers and 90 sq. ft. of baggage space are provided with a standard arrangement. The car is 60 ft. in length, and weighs complete with M. C. B. standard trucks and equipment 90,000 lb. The power plant consists of one six-cylinder, 74-in. bore by 8-in. stroke gasoline engine which delivers 250 hp. at 1,100 r.p.m. This is direct connected in turn with a 160-kw. 600-volt railway-type generator, which provides current for two 140-hp. railway-type motors. These are mounted on the front truck.

Keystone Company Is Absorbed by McGraw-Hill

Purchase of the Keystone Consolidated Publishing Company of Pittsburgh, Pa., by McGraw-Hill Company, Inc., publisher of the *ELECTRIC RAILWAY JOURNAL*, has been announced. The latter company thereby acquired the two Keystone mining catalogs, the



Guests of Brill and Westinghouse Companies at Demonstration of Gas-Electric Car

paid to the item of comfort in equipping this car for passenger service.

Upon the completion of the demonstration run in the morning, members of the party were driven to the Benjamin Franklin Hotel where a very tasteful luncheon was served. However, even without this additional courtesy those present were quite willing to vote the occasion a most interesting one.

Considering the fact that these gasoline-electric cars have only been placed on the market by the manufacturers for a short time—since last fall, in fact—the total of twenty cars sold is quite an imposing one and speaks well for the impression which the units are creating. The New Haven order of five cars is the largest thus far made.

coal catalogs, mining and quarrying directories and the list services published and conducted by the Keystone company.

There is thus brought into one organization the outstanding publishing interests serving the mining field. McGraw-Hill company with its magazines, *Coal Age* and *Engineering & Mining Journal-Press*, and the Keystone company with its catalogs, directories and list. *Coal Age* and *Engineering & Mining Journal-Press* have served the mining industries for more than two generations, and the purchase of the Keystone property will enable them to broaden and intensify that service.

Joseph J. Vigneau, the founder of

the Keystone Company, and until now its president, will continue in charge of the Keystone business for the McGraw-Hill Company with offices in Pittsburgh. Ralph C. Becker, hitherto vice-president of the Keystone Company, will continue in charge of the sales with headquarters in New York. Except for the retirement of Edward B. Day, New York representative, there will be no changes in the staff of the Keystone organization, but the service of the organization will be augmented by all the editorial and advertising resources and strength of the McGraw-Hill Company.

Progress in Stimulating Modernization

Progress is being made in the organization of the manufacturers' executive committee which will have general charge of the campaign to stimulate further development in car design and to bring about the replacement of obsolete equipment. Managing Director Storrs, who agreed at the last general meeting of car and equipment manufacturers to undertake the formation of this committee, has been giving the matter careful study. It is his plan to include in the personnel of the committee executives from leading manufacturers in the industry who will be in positions to speak authoritatively and to bring about general co-operation in executing plans that are formulated.

This committee will act as a clearing house to determine how the manufacturers can help the industry to modernize its equipment. A special sub-committee of experts, including J. A. Brooks of the J. G. Brill Company, C. A. Burleson of the General Electric Company and W. J. Clardy of the Westinghouse Electric & Manufacturing Company, which was organized on Dec. 14 under the chairmanship of G. C. Hecker, special engineer of the American Electric Railway Association, has been busy gathering information for its work. The services of these men have been donated by their respective companies. Their object will be primarily to gather information on the performance of modern electric railway cars and to stimulate further development and reduction in number of types and sizes of cars and equipment.

Material and information gathered by the committee will be given wide publicity in the industry. Many companies are preparing to co-operate in stimulating interest in car modernization by advertisements calling attention to the advantages of modern equipment.

480 New Cars and 75 Buses Needed at Detroit

The Department of Street Railways at Detroit, Mich., is now 150 cars short, will need 150 more cars for next year's business, should replace 180 cars now in use but considered unfit to run, and will need 75 more buses for the present routes. The cost of this equipment is estimated at \$7,000,000. The needs of the department were outlined by Col. H. U. Wallace, general manager of the Department of Street Railways, in a talk at the annual dinner of the officials

given on Dec. 28 by the governmental committee of the Detroit Board of Commerce.

In addition the need of new trackage was cited. It was stated that about \$1,500,000 will have to be spent to replace worn-out physical equipment. Although much work has been done in the past three years to improve the physical condition of the property purchased from the Detroit United Railway it was cited that more work is necessary.

Rolling Stock

Boston Elevated Railway, Boston, Mass., has announced specifications on the 60 subway cars referred to in the *ELECTRIC RAILWAY JOURNAL*, issue of Dec. 19 and Dec. 26, 1925. The details:

Date order was placed.....	December, 1925
Date of delivery.....	March, 1927
Builder of car body.....	Osgood-Bradley Car Company
Type of car.....	Passenger subway
Seating capacity.....	72
Weights:	
Car body.....	Approximately 40,000 lb.
Trucks.....	Approximately 22,300 lb.
Equipment.....	Approximately 20,100 lb.
Total.....	Approximately 82,400 lb.
Bolster centers, length.....	51 ft. 0 in.
Length over all.....	69 ft. 2 1/2 in.
Motor truck wheelbase.....	7 ft. 0 in.
Trailer truck wheelbase.....	6 ft. 0 in.
Width over all.....	9 ft. 6 in.
Body.....	All steel
Interior trim.....	Steel
Roof.....	Modified arch
Air brakes.....	Westinghouse
Axles.....	A. E. R. E. A. specification
Bumpers.....	Hedley anti-climbers
Car trimmings.....	Bronze
Center bearings.....	Truck builder
Side bearings.....	Stucki
Compressors.....	Westinghouse DH-25
Control.....	Westinghouse ALF
Couplers.....	Tomlinson-Ohio Brass Company
Door-operating mechanism.....	Electric
Gears and pinions.....	Westinghouse Electric & Manufacturing Company
Hand brakes.....	Vertical wheel, geared type
Heater equipment.....	Electric
Journal bearings.....	Plain
Journal boxes—Steel, 4 1/2 in. x 8 in. trailer, 5 in. x 9 in. motor	
Lightning arresters.....	Westinghouse
Motors, type and number.....	Two Westinghouse 577-P-1, inside hung
Oilers (for 20 motors).....	Rico wedge-key axle caps
Seats.....	Longitudinal, made by B. E. Rwy.
Seating material.....	Wood slats
Springs.....	Wason Manufacturing Company
Trucks.....	Wason Manufacturing Company
Ventilators.....	Perry
Wheels.....	Trailer 31-in. steel; motor, 34-in. steel

Seattle, Wash.—The City Council has passed Councilman W. T. Campbell's bill providing for a \$1,800,000 issue of street railway utility bonds to finance purchase of 75 new street cars. D. W. Henderson, the superintendent, estimates that nearly \$300,000 a year can be saved by replacing 75 of the old type heavy cars with cars of a lighter type and for one-man operation. The measure as passed bore little resemblance to the original measure. That provided for a bond issue of \$3,500,000, of which \$2,000,000 was for paving between tracks and for track extensions. The Council held that this would be a burden too great for the department.

Northern Ohio Traction & Light Company, Akron, Ohio, has ordered 25 freight trailers from the Kuhlman Car Company, built in accordance with the specifications agreed to by the C.E.R. Master Mechanics' Association.

Michigan Railroad, Jackson, Mich., is now buying fifteen freight trailers equipped with Westinghouse WC-12 air brakes and standardized C.E.R.A. dia-

mond frame arch bar truck, with 33-in. steel wheels. The cars being purchased are in accordance with the standards as approved by the C.E.R. Master Mechanics' Association for freight trailers, with the exception that as the Michigan companies are hauling as high as twenty-car freight trains, it was considered advisable to specify the heavier type Tomlinson coupler, form 23, instead of the Tomlinson form 13, which has been standard on those properties.

Western Ohio Railway, Lima, Ohio, has placed an order with the Kuhlman Car Company of Cleveland, Ohio, for ten standardized freight trailers costing \$3,100 each. The specifications are those recently adopted by the C.E.R. Master Mechanics' Association.

Track and Line

New York State Railways, Rochester, N. Y., renewed more than 5 miles of track and pavement in 1925. Tracks and new pavement were laid on the following streets: Monroe Avenue, 11,872 ft. of track; Blossom Road, 3,541 ft.; Mount Hope Avenue, 2,904 ft.; Goodman Street, 3,000 ft. Extraordinary repairs were made at the following locations, where the rail was renewed and the pavement replaced: Commercial Street, 311 ft.; Franklin Street, 1,420 ft.; Caledonia Avenue, 306 ft.; Bronson Avenue Bridge, 200 ft.; Central Avenue, 500 ft.; Saratoga Avenue, 700 ft. There were no extensions of track made during the year of 1925, and two cross-overs were removed. During the year 4,000 ties were renewed with the corresponding number of bolts, plates and spikes and paving materials. Twenty-seven switches, nineteen mates and 41 frogs were renewed, as well as much guard rail in the special work layouts.

Spokane, Wash.—The Spokane & Eastern Railway & Power Company and the Spokane & Inland Empire Railway, interurban lines operated jointly out of Spokane, will expend about \$160,000 in improving roadway and bridges during 1926. New bridges will be constructed in Palouse and Colfax, Wash., and considerable track reconstruction will be undertaken this year.

Trade Notes

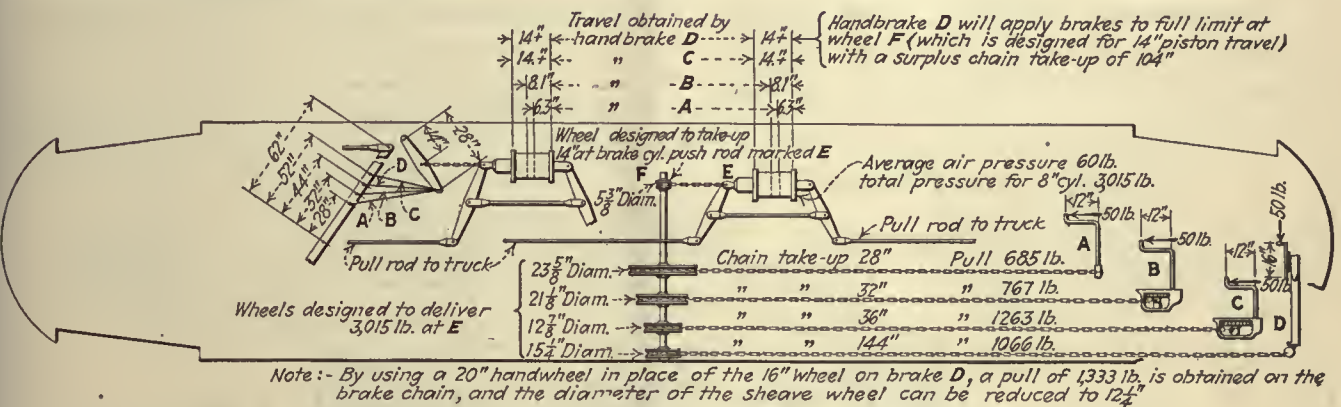
Howell Van Blarcom has been appointed manager of the sales department of the Westinghouse Electric & Manufacturing Company at the South Philadelphia and Attica Works. R. E. Carothers has been appointed assistant manager. The large turbine sales section of the South Philadelphia Works will be conducted with A. H. Gamshird as manager. The small turbine section will be in charge of C. G. Ong, while P. L. Fetzter will be manager of the condenser section.

C. H. Lang, assistant manager of the publicity department of the General Electric Company, has become comptroller of budget for the company, a new position. Mr. Lang will pass upon the annual expense budget of the company and will report direct to the vice-presidents in charge of the several departments and to the comptroller.

Modernize your hand-brake ideas, also!



Notions about hand-brakes, current ten or fifteen years ago, are now as obsolete as those 25,000 cars the industry is discussing.



Hand Brake Layouts for Cars with 8-in. Brake Cylinders

Type of Hand Brake	Designated by Letter	Pull Delivered by Hand Brake	Braking Power at E	Maximum Chain Pull Obtained by Hand Brake	Chain Pull Required by Hand Brake for 14 In. Push Rod Travel	Maximum Travel of Push Rod at Point E	Surplus Chain Take-Up	Deficiency of Chain Take-Up	Remarks
Ordinary staff.....	A	685 lb.	3,015 lb.	28 in.	62 in.	6.3 in.	.....	34 in.	55 per cent less than required
Peacock, size A-B.....	B	767 lb.	3,015 lb.	32 in.	55 in.	8.1 in.	.....	23 in.	42 per cent less than required
Peacock, size E.....	C	1,263 lb.	3,015 lb.	36 in.	34 in.	14. + in.	2 in.	.....	5.8 per cent more than required
Peacock, staffless.....	D	1,066 lb.	3,015 lb.	144 in.	40 in.	14. + in.	104 in.	.....	260 per cent more than required

Consider the conditions shown above

PEACOCK STAFFLESS BRAKES



Obsolete hand-brake equipment is just as much a problem as the obsolete cars. Many a new car has had old and ineffective hand brakes installed, on the indifferent theory that they were "good enough."

Light weight cars and higher speeds have imposed new conditions on hand brakes, which the old types will not meet. Particularly is this true, of chain-winding capacity. In the above illustration, four different types of brakes are illustrated, only two of which will be effective at all times.

When thinking of modern cars, think of modern hand-brakes, also!

National Brake Company
890 Ellicott Square, Buffalo, N. Y.
Canadian Representative
Lyman Tube & Supply Co., Ltd., Montreal, Can.

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Lest You Forget



The Famous Fourteen Points have passed into history and almost into oblivion, while the Nuttall Thirteen Points and the Famous Nuttall 13-E Trolley Base are daily making enviable service history

1. Oil Reservoir. Positively retains oil or grease and is exclusively a 13-E feature. To fill, remove the flathead screw shown in top of swivel cap.
2. Rollers and Cage. Rollers are hardened and assembled in a cage, which maintains alignment and permits assembly as a unit.
3. Races—Inner and Outer. The races are made of "SHELBY" tubing, machined, hardened and ground.
4. Trigger Lock. Locks Pole Socket in horizontal position, enabling one man to change poles in the barn under low headroom.
5. Buffer Spring. Cushions the pole socket in case the wheel leaves wire.
6. Terminal Connector. Cast Bronze Connector for sweating to Motor Lead insuring good contact. Clamp type furnished if preferred.

7. Pole Socket Bearing. Hardened Steel Bushing maintaining indefinitely a good close fit with axle pin No. 11.
8. 2-Bolt Pole Socket. Two bolts insure firmer grip and require less time for applying pole.
9. Adjusting Screw. One adjustment for all four springs.
10. Shunts. Heavy phosphor bronze straps for shunting the current from Pole Socket and Swivel to Base.
11. Axle Pin. Pole Socket Axle Pin made of hardened steel.
12. Dust Guard. Protects Roller Bearing from dust and water.
13. Accessibility. By removing these heavy locking screws and unhooking springs, the bearing cap can be removed, exposing swivel portion of base.



R.D. NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

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is turned out with equal care in our shops. The orders we all differ only in magnitude; small orders command out utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we built. That's why so many electric railway men rely absolutely on our name.

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Remove Snow as it falls—with Root Scrapers.

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The advertisements in the Searchlight Section are constantly bringing together those who buy, sell, rent or exchange. They convert idle commodities into useful cash, idle cash into useful commodities, and that which you have but don't want into that which you want but don't have.

The cost is a trifle, the results considerable.

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Get Your Wants into the Searchlight

THE P. EDWARD WISH SERVICE

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Street Railway Inspection
DETECTIVES

131 State St.
BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.



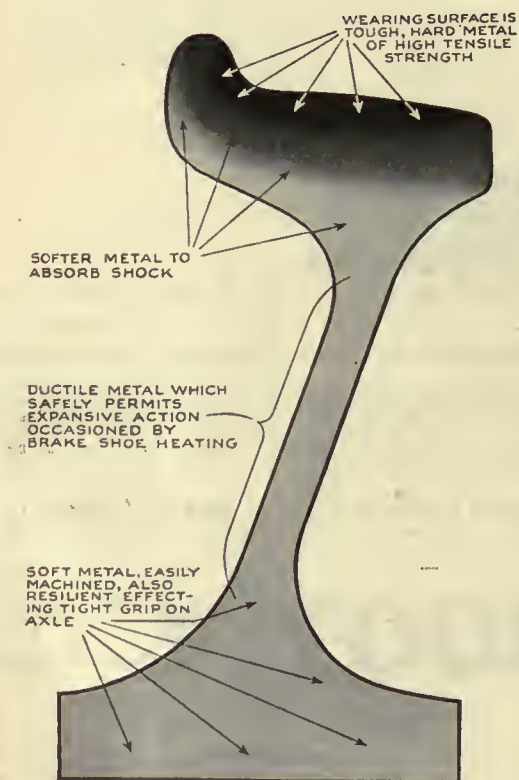
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Switch and Frog
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A BALANCED UNIT*



The Hub, Plate and Rim of a Wheel perform vastly different functions.

The Davis "One-Wear" Steel Wheel is made of Special Composition Steel scientifically heat treated to impart the required physical properties to each component part.

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are worth more than any other wheels.

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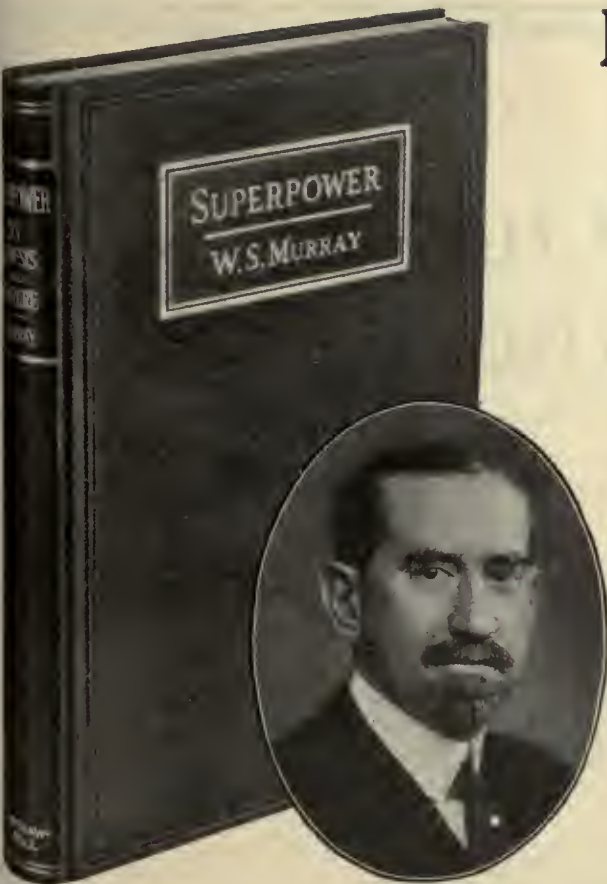
NEW YORK

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* A proper distribution of required physical properties.

DAVIS WHEELS ARE SAFER WHEELS



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on

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What Superpower Is

What it means to industry—What it means to you

The book explains what has been done thus far. It describes results in five great divisional zones which have already applied the principles of superpower. The record of accomplishment is startling yet indicative of what may be expected from the further extension of a program basically sound in its every phase, fundamentally desirable from every point of view.

SUPERPOWER

Its Genesis and Future

By WILLIAM SPENCER MURRAY, of Murray and Flood, Engineers
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This new book—just published, is the work of the man who first conceived the idea of SUPERPOWER and who was Chairman of the United States Government's Superpower Survey.

Mr. Murray starts with the conditions and methods of today and carries them forward to their ultimate and logical conclusion.

The reason and method of superpower

The opening chapter emphasizes the dependence of industry and consequently of our national prosperity, on the presence at the worker's elbow, of adequate and reliable power.

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**William
Spencer
Murray**

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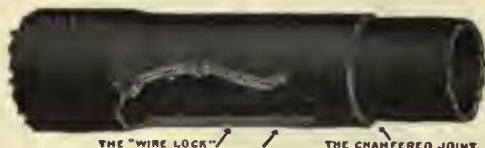


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Hubbard makes the Hardware*



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THE "WIRE LOCK" / THE CHAMFERED JOINT

COMBINE

**Lowest Cost
Least Maintenance**

**Lightest Weight
Greatest Adaptability**

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.

CINCINNATI, OHIO

New York City, 30 Church Street

THE WORLD'S STANDARD

"IRVINGTON"

Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation Flexible Varnished Tubing
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BARE COPPER WIRE AND CABLE

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**WEATHERPROOF WIRE
AND CABLE**

**PAPER INSULATED
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Pittsburgh, Pa.
Branches in all
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Trade Mark Reg. U. S. Pat. Off.

Made of extra quality stock firmly braided and smoothly finished.
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.

SAMSON CORDAGE WORKS, BOSTON, MASS.

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Rods, Wire Cable Products

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WELDING CABLE

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UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.
Positions Vacant and all other classifications, 8 cents a word, minimum charge \$2.00.
Proposals, 40 cents a line an insertion.

INFORMATION:

Per Numbers in care of any of our offices count 10 words additional in undisplayed ads.
 Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....\$4.50 an inch
 4 to 7 inches.....4.30 an inch
 8 to 14 inches.....4.10 an inch
 Rates for larger spaces, or yearly rates, on request.
 An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

POSITIONS WANTED

ELECTRIC railway engineer, 25 years' experience, desires new connection, as general manager or assistant in operating field. Previous experience has been with two of the largest electric railways in U. S. One combined city and interurban, other in very large city. PW-877, Electric Railway Journal, Tenth Ave. at 36th St., New York.

ENGINEER of twenty years' experience in construction and maintenance of paved and open track, overhead lines and buildings, desires position as engineer of way. PW-876, Electric Railway Journal, Real Estate Trust Bldg., Phila., Pa.

SUPERINTENDENT transportation, qualified by a wide experience and successful record on large city and interurban properties; successful in handling labor. Public relations, safety campaigns, etc., recognized as an efficient, progressive official fully capable of getting results. At present engaged. Personal reasons for desiring change. High-class references from leading executives. Correspondence invited. PW-858, Electric Railway Journal, 401 Guardian Bldg., Cleveland, Ohio.

LANG BUS BODY

New aluminum 21-passenger special street car type body, for Studebaker, mounted on chassis. Body price, \$2,150, plus tax. *For particulars write*

LANG BODY CO.
 3088 W. 106th St., Cleveland, Ohio

FOR SALE

20—Blrney Safety Cars. Brill built. Seating 32.
 8—Steel Interurbans, 48 ft. long. Seating 52.

ELECTRIC EQUIPMENT CO.
 Commonwealth Bldg., Philadelphia, Pa.

S EARCHLIGHT
 SERVICE
 SECURES
 SATISFACTORY
 SITUATIONS

G-23

4 High Grade, High Speed, 56 PASSENGER COMBINATION (Smoking and Baggage) CARS

Exceptionally Good for Interurban Service
 All in excellent condition. Built by Kuhlman. Length over all, 57 ft. Height over trolley board, 12 ft. 5 in. Height over all, 13 ft. 10 in. Number of seats, 26. Type of motor, four G. E. 205. Make of trucks, Brill. Wheel base, 7 ft. Controller, G.E.—MC—74. Toilets, 34x36-in. Air Compressor, WH-D-2.

For illustration of these cars, see our advertisement in the January 2nd issue of this publication. Watch for future announcements of other types of cars.

J. W. GERKE, *Railway Equipment*
 303 Fifth Ave., New York City

ROTARY CONVERTERS

4—300-kw. Westinghouse, 600 volts D.C., 6 phase, 60 cycle. Each unit complete with panelboard and instruments and 33,000 volt step down transformers. Excellent condition.

3500—Metal Trolley Pole Arms or Hangers.
 HYMAN-MICHAELS COMPANY
 Peoples Gas Building, Chicago, Illinois.

If there is anything you want—

or something you don't want that *other* readers of this paper can supply—or use—advertise in the

SEARCHLIGHT SECTION

Somebody is always looking for something to meet certain business needs. Some men in charge of plant operations may be in the market for good used equipment—others may have just what they want, to sell. Some may require a man of unusual quali-

fications for a particular position—that man may be another reader of this paper!

Put the Searchlight Section to work for you under any of the following classifications—to fill your business needs.

Agencies Wanted
 Agents Wanted
 Auction Notices
 Buildings For Sale
 Business Opportunities
 Civil Service Opportunities
 Contracts To Be Let

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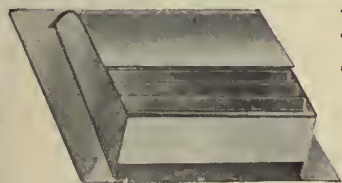
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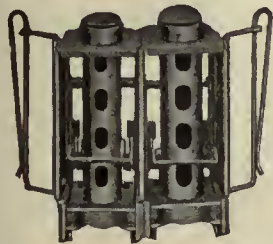
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Nachod Signal Co., Inc.
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Adjusters)
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Elec. Ry. Improvement Co.
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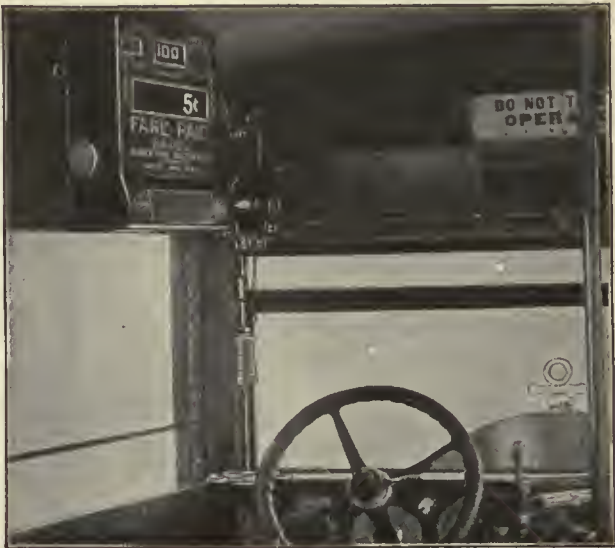
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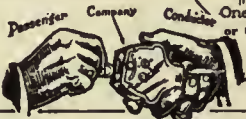
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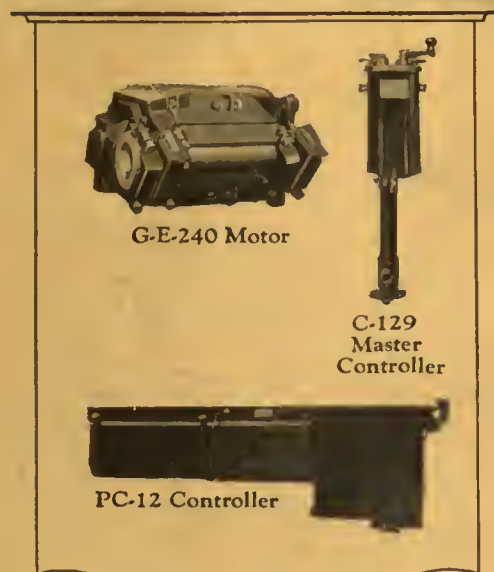
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11-66

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GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN ALL PRINCIPAL CITIES

ELECTRIC RAILWAY JOURNAL

AL.

TRIC RAILWAYS EXPAND IN 1926

ases for Year Estimated \$296,150,000, a Gain of 11.66% Over 1925.

SES CAUSE INCREASE

penditures for New Track to Go Up \$20,000,000—This Year's Figures 50% Above 1923.

Purchase of new railroads in the United States in 1926 will total \$296,150,000, an increase of 11.66 per cent. over 1925 and an amount greater than the estimated expenditures for 1923, 1924 and 1925, according to the Electric Railway Journal. Expenditures for new plant and maintenance materials in 1925 amounted to \$265,250,000, in 1924 to \$262,700,000 and in 1923 to \$282,000,000. Electric railways plan to spend \$147,380,000 in 1926 for maintenance, materials and supplies, against \$141,620,000 in 1925 and \$129,500,000 in 1924. The 1926 figure is an increase of 50 per cent. over the \$102,000,000 figure for 1923. Expenditures for new plant and equipment in 1926 are expected to total \$148,770,000, compared with \$123,630,000 in 1925. While expenditures for buses largely account for the increase in 1926, it is estimated that 1926 expenditures for way and structures, largely new track, will increase about \$20,000,000. Segregation of equipment expenditures into rail cars and buses is a new usage in the estimates. New buses and accessories purchased by electric railways in 1925 were valued at \$15,000,000, or 23.8 per cent. of the total amount spent for equipment. Expenditures for equipment in 1926 are estimated at \$23,000,000, or 33.2 per cent. of the total. Expenditures for both classes of carriers in 1926 are estimated at \$63,450,000, against \$60,080,000 in 1925. Relief from paying charges is reflected in the \$72,000,000 estimated expenditure for 1926 on new track. This compares with \$32,400,000 in 1925 and with \$36,000,000 in 1924. New plant expenditures are expected to total \$8,320,000 in 1926, a decrease from the figure of \$5,150,000 in 1925 and of \$17,000,000 in 1924. Increased use of purchased power is the reason given for this decline.

EQUIP DECREASE

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But how?

Progressive and courageous financial and managerial leadership is looking to its engineering staffs,

both in the manufacturing and operating fields, for those same qualities in order to make good the implied promise of this *Times* headline.

That its faith is justified is evidenced by the enthusiasm of the special A.E.R.A. committees on car design and development, by power savings both in production and operation and by better transportation methods and better selling of transportation.

In the track field this justification is found in our 1925 collection of track costs which indicate that much renewable base, twin tie construction built with high-class rail, joints and paving was installed at a lower cost than wood tie, stone ballasted construction.

May we send you these figures as a barometer to check your efforts to help your "Electric Railway to Expand in 1926?"

THE INTERNATIONAL STEEL TIE COMPANY
CLEVELAND, OHIO

Financial Section,
New York Times,
January 3, 1926

Steel Twin Tie Track

Renewable Track

Permanent Foundation

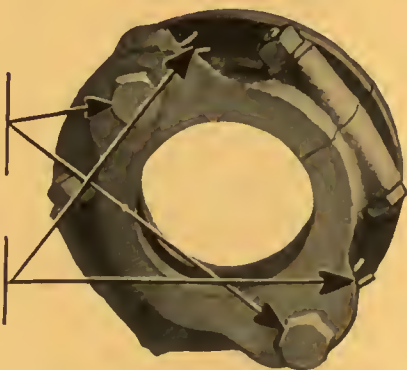
HOW MANY—

of your motors are held in the correct position on the axle?

Consider the armature end-play and the lateral movement of the motor on the axle, as commonly experienced, which result in a short life of pinions, bearings, gear cases, etc. Why not give your motors a "sporting chance" with a *Quality Axle Collar*?

Adjustable Screws
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Permit taking up
end-play of motor
on axle.

Adjusting Bolts
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to prevent change in
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vides dust-proof pro-
tection at the rub-
bing surfaces.

The material of the
collar is semi-steel,
strong and durable.

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Careful machining
assures a tight clamp
action of the collar
on the axle seat.

Clamping Screw

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1926



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Vol. 67
No. 3

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It Pays to Bind

TWO railway men, one the newly appointed general manager of a city property, were talking of the difficulties so often encountered in negotiating with municipal authorities.

"Our City Council does not realize the essential character of the service rendered by the street railway," the new g. m. remarked. "I have told them in a general way about the experience of cities that have tried to get along without the railways—Bridgeport, Des Moines, Toledo, Newark, and Akron—but I wish I had more data on this subject."

"Why don't you look it up in the back numbers of ELECTRIC RAILWAY JOURNAL?" asked the other.

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at 300 v.*

150 lbs.



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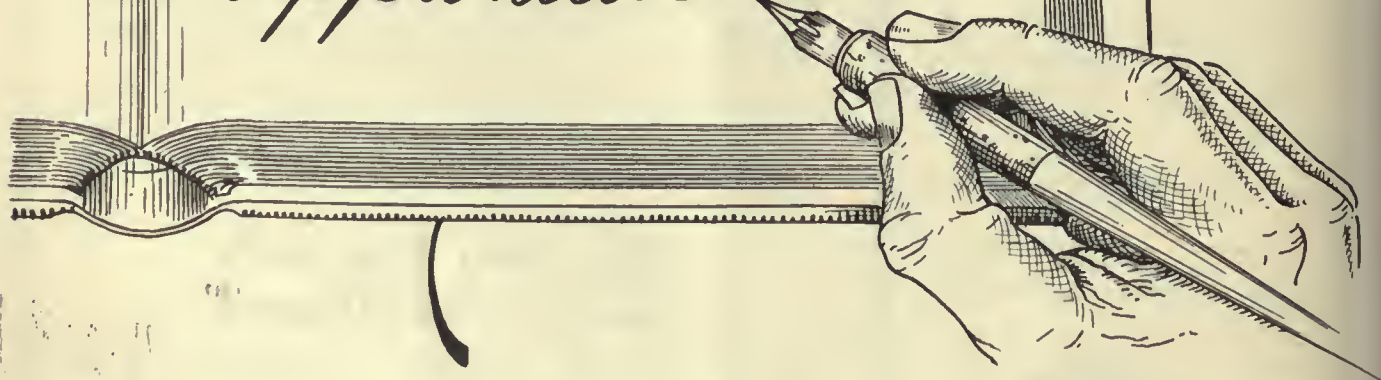


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Prompt Service—Everywhere

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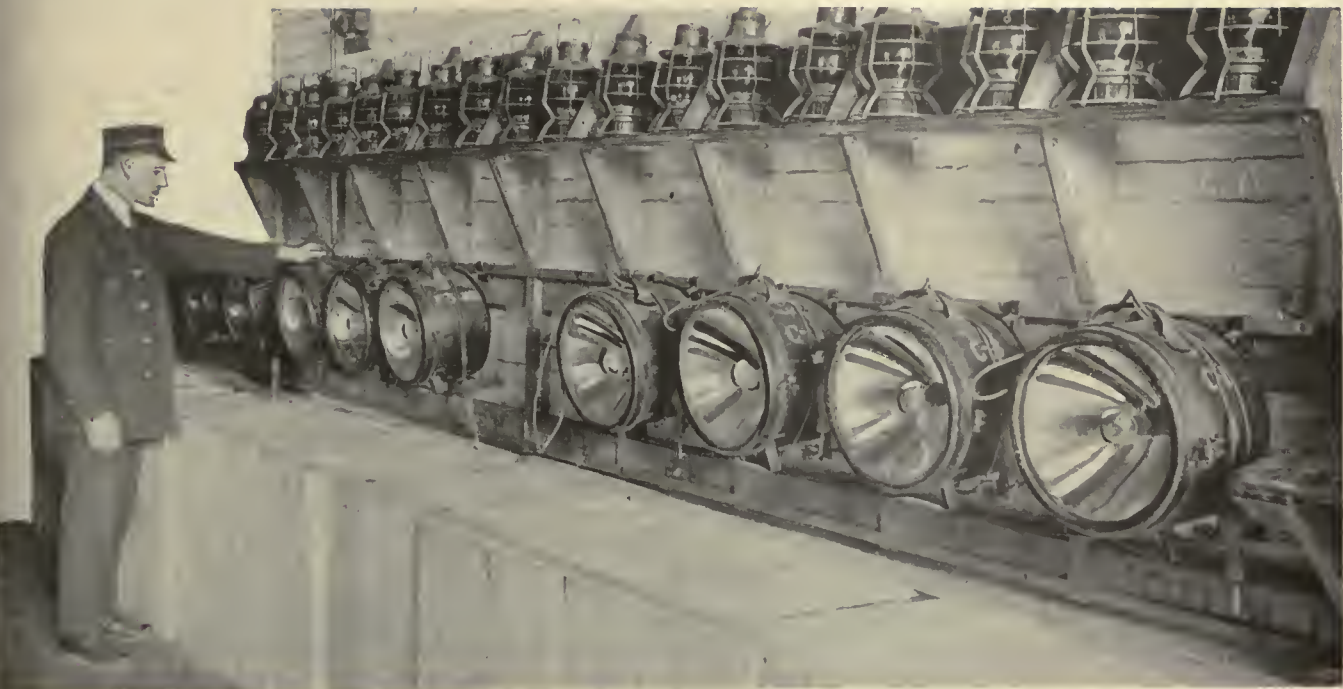
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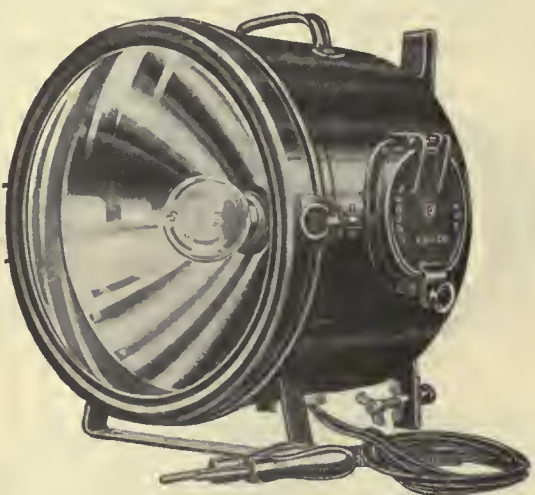


Dash Type

The Golden Glow reflector will not scratch, tarnish or corrode. It is a permanent reflector and easy to keep clean.

Golden Glow Headlights are made in various styles and sizes to suit any requirements. Portable or built-in, —dash installations and roof mountings.

See ESSCO Catalog No. 7 for further illustrations and descriptive matter.



Portable Type

Simplicity, the Keynote of the Christensen Brake

No outside
levers, pull
rods, cables,
knuckles,
universal
connections,
or cams.



A CYLINDER mounted inside the brake drum; two opposing pistons whose stems transmit a direct thrust against opposite ends of the brake shoe; nothing else.

The only connection between wheels and frame is the flexible reinforced hose that carries the air to the cylinder.

No adjustment is ever necessary from the time the brakes are originally set up until the linings are completely worn out, and

because of the even, positive braking power, extremely long life is obtainable from linings.

Very low brake maintenance costs result from Christensen simplicity. "Out of service" for brake adjustment or repairs is extremely rare.

It will pay every one in any way responsible for bus operation or who is contemplating the operation of buses to read the descriptive booklet "Christensen Automotive Air Brakes." Send for your copy.

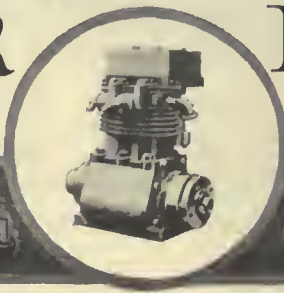
Christensen Air Brakes can be secured as original equipment upon the leading buses when specified.

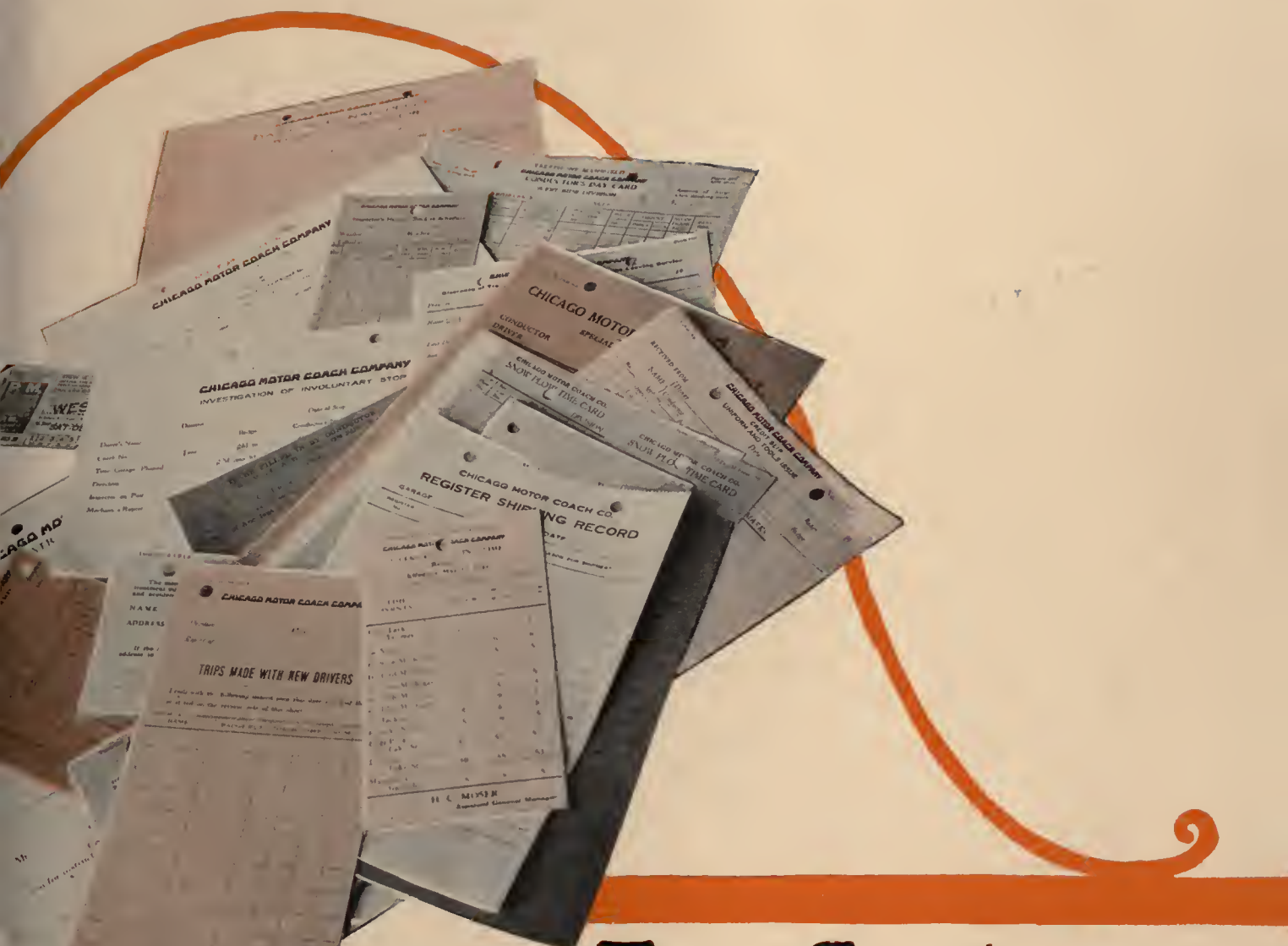
Christensen

AIR BRAKES

CHRISTENSEN
6513 Cedar Ave.

AIR BRAKE CO.,
Cleveland, Ohio





The Systems we use in our business as *Operators*





**are available
for your
use!**



OPERATING experience is the key to revenue earning, which means *low-cost, profitable miles.*

To operate 2 ½ million miles per month on the streets of New York, Chicago and



St. Louis, and carrying 150,000,000 passengers a year, call for a vast organization behind it.

From this great laboratory, on the street, have come

the forms necessary to keep the system running smoothly and check operation.

Transportation is an industry that calls for a business structure to back the operation of motor buses, and Yellow Coach experience has accumulated



a system which is completely at the disposal of a railway.

When Yellow Coach recommends, it yields freely every method down to the last form card, that is used in our own transportation business.

YELLOW

The result to the railway seeking advice is valuable beyond estimation. Factors secured are:

1. The proper sort of accommodation to the public: comfortable, reliable and safe.
2. Profit to the operating company, which means the carrying of the maximum number of passengers at the lowest cost per mile.
3. The installation of a complete working system.
4. The selection, desired, of operating personnel and the training of the men employed.

In Yellow Coach, transportation units are used merely as a means to an end, but that end is *low-cost, profitable miles*.

Where else can this service be duplicated?

A study of Yellow Coach literature will likely answer some of *your* problems. Write for our catalog and other interesting data. We will be glad to make a transportation survey for you.

COACHES



Strength of personnel —

AN ORGANIZATION is only as strong as the men who make it. This is particularly true of a company which sells *service*, or, in the case of Yellow Coach, *transportation* on a basis of *low-cost, profitable miles*.

Yellow Coach management has been built up with men who are specialists in their line of endeavor. Their transportation experience has been secured on the firing line of actual operation. Their engineering and manufacturing experience has been gained through close study and association with transportation practice and needs. For example—

EDWARD WOTTON, *Equipment Engineer*. Mr. Wotton, Superintendent of Maintenance, has the distinction of being the first man to drive a motor coach in America. Mr. Wotton obtained his first experience in the mechanical field with the firm of Brazil, Holbrow and Straker, manufacturers of steam lorries in Bristol, England. He was a demonstrator for the company which constructed the first gasoline buses made in England. In 1906 Mr. Wotton came to the Fifth Avenue Coach Company. As general mechanical foreman for that Company, Mr. Wotton established a world-wide reputation in the development of the motor coach from a mechanical standpoint. As General Superintendent of Maintenance and Equipment for the Chicago Motor Coach Company, Mr. Wotton is in constant consultation with the mechanical staff of the Yellow Truck and Coach Manufacturing Company.

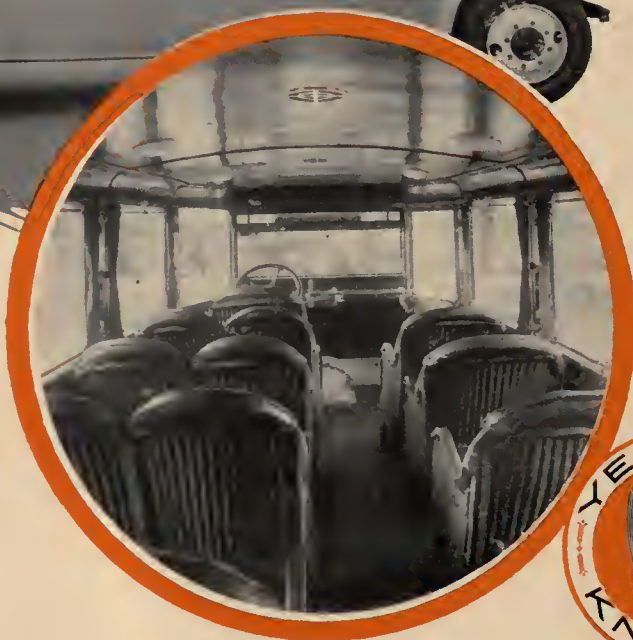


*There is no substitute
for experience —*



Type X 17-21 Passenger
Parlor Coach

Interior view looking forward



Transportation experience expressed in interior fittings!

THE interior of Yellow Coaches clearly demonstrates the care used to incorporate transportation experience into every part of Yellow Coach design.

It is essential that the interior of public vehicles be kept clean and sanitary. The seating arrangements and finished interior must be planned for beauty of appearance combined with easy and economical maintenance.

In the design illustrated above,

Yellow Coach has surrounded the passenger with a degree of luxury and comfort comparable to the finest privately enclosed cars. Seats are de luxe wicker chairs finished in frosted mahogany and upholstered in genuine brown Spanish leather. Side post panels and roof headlining are of matched grain mahogany. French plate mirrors on every sidepost.

Transportation experience is expressed in this construction—for the benefit of both riders and operators.

YELLOW TRUCK & COACH MANUFACTURING COMPANY
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.

Progress ~ more than a word!

It's easy to repeat the slogan! It's simple to applaud the abstract idea.

But the next step is to bring the concrete questions down to
your own properties—how many new cars are needed
—how many existing cars can be modernized—
what types of equipment are essentially
modern—and will progress of this
character pay for itself?



NATIONAL PNEUMATIC

Backed by many years' experience in modernizing railway cars, the National Pneumatic organization can be relied upon to furnish practical ideas, workable plans, and the most efficient door and step operating equipment.

In line with present tendencies of other leaders in the industry, the National Pneumatic Company has developed new and improved apparatus, designed to increase speed, reduce labor, and at the same time actually add to the safety of railway operation. Some of our latest developments, for example, are:

New Light-Weight Door and Step Mechanism
New Refinements in Door Engine Design
The Automatic Treadle Exit Door
The Fare Box Motor

NATIONAL PNEUMATIC COMPANY

Executive Office, 50 Church Street, New York

General Works, Rahway, New Jersey

CHICAGO
518 McCormick Building

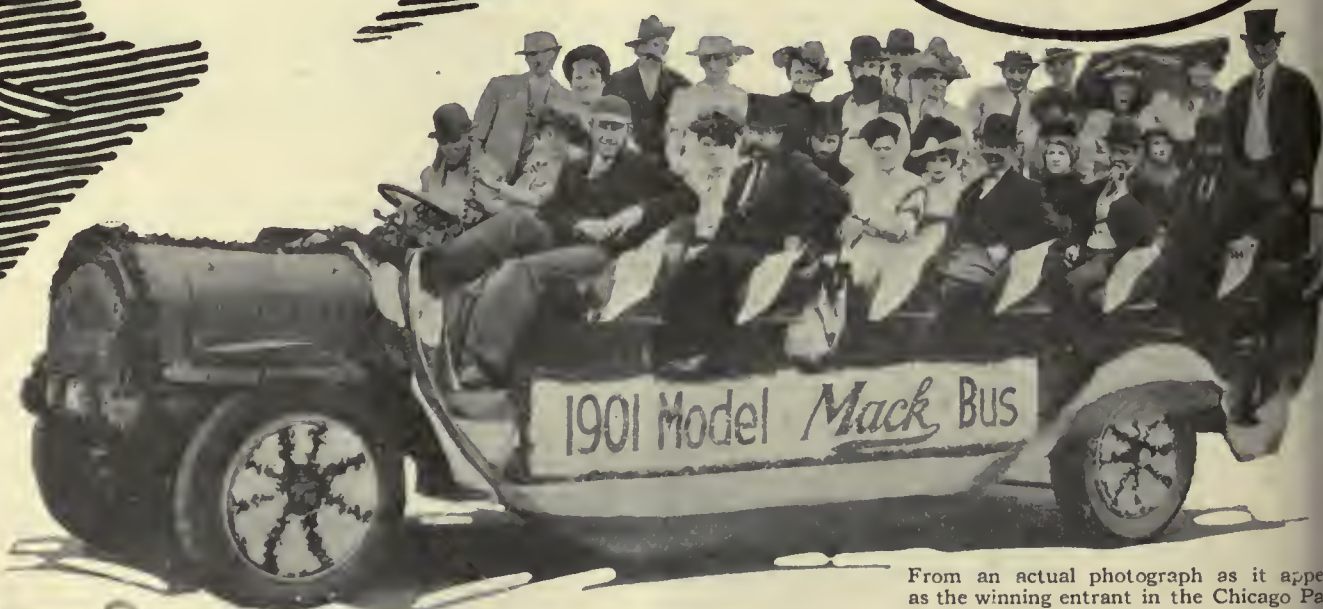
MANUFACTURED IN
TORONTO, CANADA, BY

PHILADELPHIA
1010 Colonial Trust Building

Railway & Power Engineering Corp., Ltd.



The first bus was a Mack
—the first Mack was a bus



From an actual photograph as it appeared
as the winning entrant in the Chicago Parade



Old Mack No. 9
The Oldest Bus in the country
!



What's behind
the Bus you buy?

The Mack migration — Be on the lookout for old No. 9 when it stops at your city —

Old MACK No. 9, the oldest bus in the country, is touring the United States under its own power. It is headed your way. Ultimately it will arrive, and when it does you will surely want to see this ancient relic which so vividly recalls the earliest days of the bus industry.

Mack Brothers, the original of Mack Trucks, Inc., almost a quarter of a century ago, 1901, to be exact, made, delivered and sold to Higgins' Tours of New Orleans and Chicago this sightseeing bus. It was the ninth gasoline vehicle they had built. After 23 years of active and uninterrupted service with its original owners, Old Mack No. 9 has returned to the fold and is again the property of its makers. It has travelled between 750,000 and 1,000,000 miles, has consumed more than 250,000 gallons of gasoline and in actual number of miles travelled has circled the globe 30 times. The chassis and body are the identical units which were delivered in New Orleans way back in 1901. The old motor, with the exception of normal replacements, is the same old snorter which was first bolted to the chassis frame so long ago.

And now Old Mack No. 9 is visiting you, under its own power. For two years it will tour the country, visiting every one of the 95 Mack branches. From Coast to Coast and from the Mexican Border to the Great Lakes this old bus will migrate.

Months ahead the tour is scheduled. Everybody wants to see Old Mack No. 9. You will want to see it when it chugs up to your city. Drop us a line and ask us when it is coming. We will be glad to give you its schedule, let you know when to expect it, and at the same time send you a little illustrated booklet of its history. Just say, "When will Old Mack No. 9 arrive here?"

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York City

Ninety-five direct MACK factory branches operate under the titles of: "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," "MACK MOTOR TRUCK COMPANY," and "MACK TRUCKS of Canada, Ltd."



American BROWN BOVERI

Power Rectifiers Efficient in Sub-Station Service under extreme load variation

Widely used in Europe for a number of years, Mercury-Arc Power Rectifiers have found their most popular application in the electric railway field. Their ability to effectively handle the fluctuations in load on railway lines without material loss in efficiency, from no-load, to high overload, is proved. There is no inertia of heavy rotating parts to be overcome.

On the accompanying chart are curves showing the comparative efficiencies of the three classes of conversion equipment—Rectifiers, Rotaries and Motor-Generators. This data was developed from actual tests. Note the great advantage of the mercury-arc rectifier at one-quarter load, an ordi-

nary condition on traction lines in non-rush hours.

Other advantages of the Mercury-Arc Power Rectifier are:—absolutely quiet operation, no moving parts except small auxiliaries, adaptable to full automatic operation, minimum maintenance required.

Further details of the principles, construction and operating features of this equipment will be given in subsequent advertisements.

Brown Boveri engineers have developed the Mercury-Arc Power Rectifier to a high degree of perfection in Europe. We are now prepared to build and install this type of equipment in America.

Products of American Brown Boveri Electric Corporation

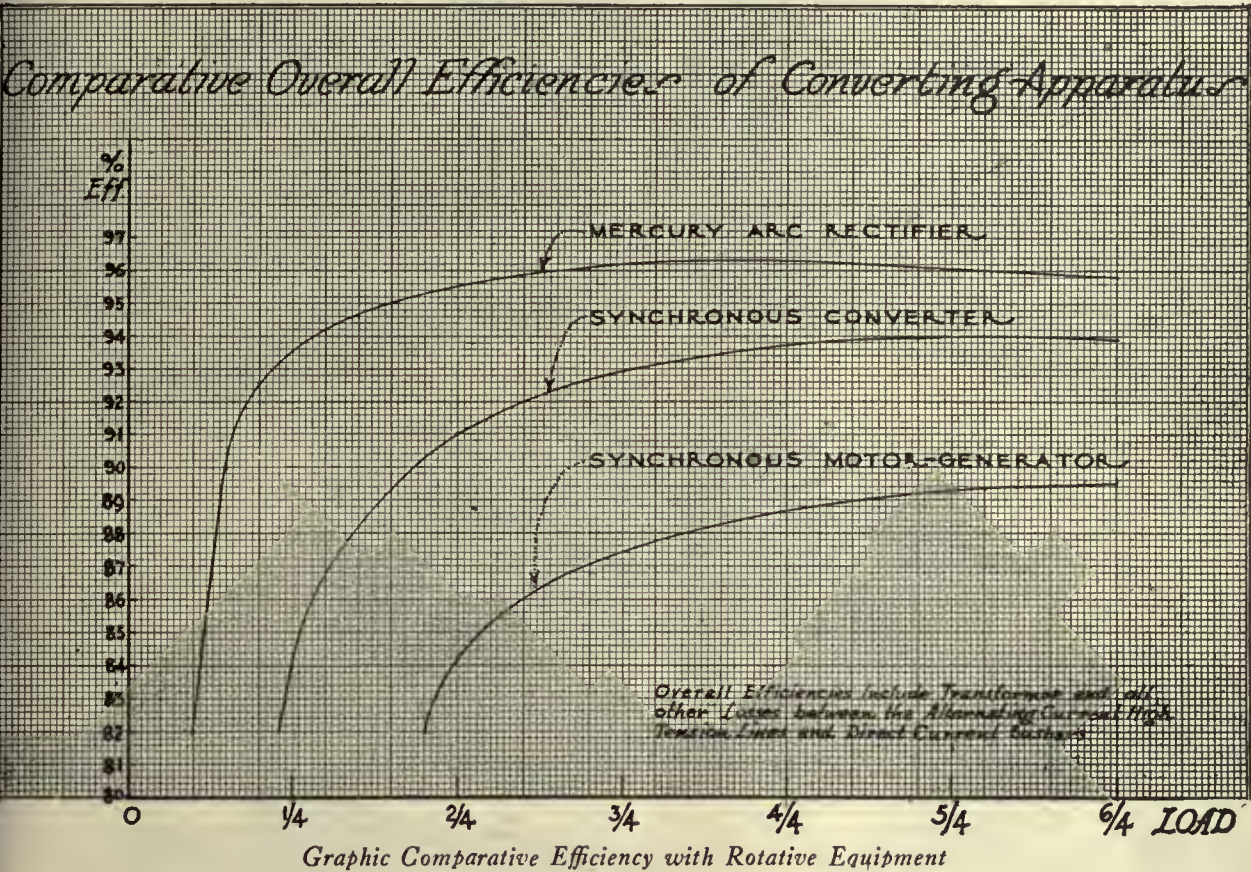
*Electric Locomotives
for any system of current, high or low
tensions
Complete Equipment
for railway electrification
Mercury-Arc Power Rectifiers
(steel enclosed)
Diesel-Electric Locomotives
Mining Locomotives*

*Motors (all sizes and types)
Rotary Converters
Motor Generators
Transformers (power or current)
Switches, Controllers
and all Auxiliary Equipment
Oil Switches
Condensers and Auxiliaries*

*Steam Turbo Generators
for normal or high pressures and
superheats
Automatic Regulators
Relays
Turbo Compressors and Blowers
Electric Furnaces
Induction Regulators*

Mercury-Arc Steel enclosed POWER RECTIFIERS

for sub-station service



Mercury-Arc Power Rectifiers pay for themselves quickly where D.C. load factor is variable or low.

In addition to their recognized position in the railway field, they can advantageously replace rotating equipment in Cen-

tral Station distribution and industrial application, not only because of their great efficiency, but because they are noiseless in operation, cause no vibration, do not require special foundation and occupy a minimum of space.

American Brown Boveri Electric Corporation

Plants at Camden, New Jersey
Main Office: 165 Broadway, New York

LIGHT WEIGHT CARS

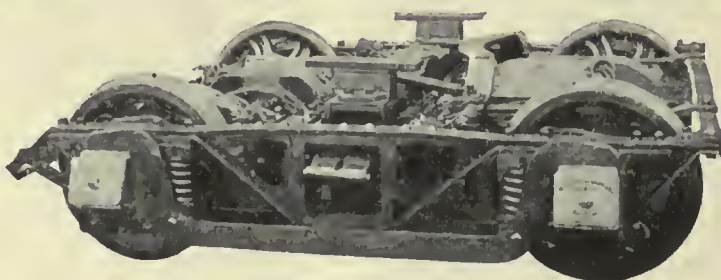
of all types for city and interurban service



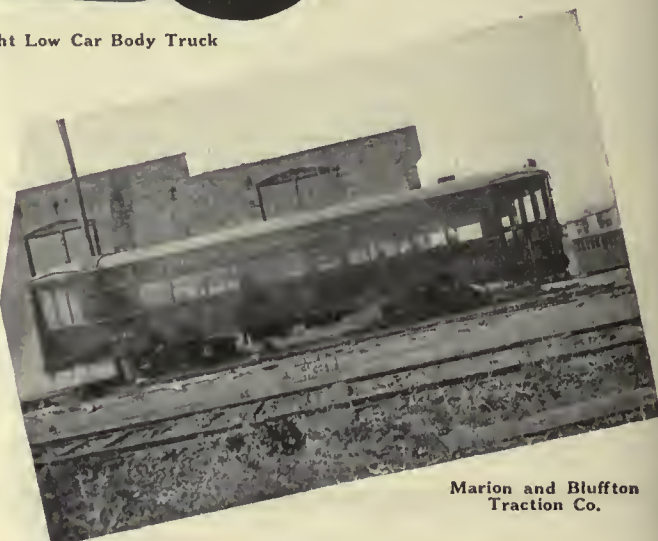
Detroit Municipal Railways



Chicago Surface Lines



Type MC-62 Light Weight Low Car Body Truck

Georgia Railway
and Power Co.Marion and Bluffton
Traction Co.

Single and Double Trucks, Snow Sweepers, Snow Plows and Work Cars
Gas - Electric Motor Coaches—Motor Coach Bodies

Our engineering department is at your service.
We will be pleased to either submit specifications
and drawings and to quote prices thereon, or we
will submit proposals on specifications furnished.

CUMMINGS CAR AND COACH COMPANY

Successors to McGuire-Cummings Manufacturing Co.
General Offices: 111 West Monroe Street, Chicago, Illinois

Pantasote
for car seats and curtains
Agasote
for roofing, headlining,
interior trim



North, South, East and West

Wherever electric cars
are operated you'll find
Pantasote and Agasote

In the great distributing Centers of the West

Omaha	Battle Creek
Chicago	Atchison
Kansas City	Kalamazoo
Minneapolis	Dubuque
St. Paul	Winona
Salt Lake City	Oshkosh

*Pantasote Products
would not be so
universally used un-
less Economy pre-
vailed after all!*

*Specify them for your buses
also!*

WARNING!

**There is
no substitute
for Pantasote**

Records of Pantasote and Agasote service cover a period of more than a quarter century. They embrace every phase of railway operation,—steam railroad, street railway and electric interurban. And still, when new car orders or supplies requisitions are made out, Pantasote and Agasote are emphatically specified.

Such experienced and successful operators as those in the cities listed above can have only one reason for consistent adherence to Pantasote and Agasote,—*proved satisfaction and economy in service.*

You, too, will find that it pays well to specify and insist upon only genuine Pantasote Products.





The cover is readily removable

The new G-E Line Breaker control handle replaces the usual main operating handle of the controller, as well as ratchet-switch, slip-ring or cam-operated contacts, which previously have been placed inside of the controller. It makes installation of line breaker equipment easier and operation better than ever before.

Reasons why it is better:

Lighter weight—in line with the lighter weight of modern car equipment.

The cover is readily removable—permitting access to working parts.

Parts are more accessible—which also facilitates inspection.

Improved blow-out.

Less installation expense—made possible by the new operating handle.

If you are not familiar with the purpose and advantages of Line Breakers, get in touch with our local railway specialist.



GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN ALL PRINCIPAL CITIES

54C-27

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

MORRIS BUCK, *Managing Editor*

Volume 67

New York, Saturday, January 16, 1926

Number 3

Modern Maintenance Means Putting Equipment in Better than Original Condition

MANY things can be done as a part of the regular maintenance work on cars that will improve appearance and provide greater comfort and convenience for passengers. It is not enough when a car comes into the shop merely to have it put back as nearly as possible into its original condition. The master mechanic should have in mind that many improvements, developed perhaps since the car undergoing repair was built, are available and may be incorporated into the design.

An example of this is the modernization of car trucks practiced by the Lehigh Traction Company, as told in an article by James W. Brown in this issue. New parts have been used that give the trucks operating qualities comparable with those of most recent design. As to the cost of doing this, of course, there is some question as to whether there is real economy as compared with the use of entirely new trucks.

Many other details of car equipment can be improved so as to give more effective service at even less proportionate cost. Among these opportunities are reduction of step height; elimination of narrow, inconvenient doors and poorly placed stanchions and barriers; location of rails and hand straps; seats; destination signs; window shades, and floor coverings.

Some of these changes can be made at no additional cost if the work is carried on at a time when the car must be overhauled anyway and new parts installed for replacement. A study of the possibilities is sure to reveal many other ways in which the older car can be vastly improved and made more acceptable to the patrons.

Extensive remodeling of old equipment is not advocated, as there are many examples where the money used for such work could have been spent much more profitably in purchasing new equipment, but there is often room for improvement in cars that are of fairly recent date. Modern maintenance requires particular attention to appearance and convenience so that the bad features of old equipment will not be thrust continually upon the rider's attention.

Lowered Step Heights Possible on Some Existing Types of Equipment

STEP heights have been given particular attention in the design of the newest types of cars. Lower steps have come with reduced motor heights, and thus are a tribute to the electrical manufacturers. Some railways which have purchased new equipment have decreased wheel diameters on old cars correspondingly in order to reduce the number of sizes of wheels used. This has also reduced step heights.

Mechanical departments are loath to decrease the clearances between the roadbed and the bottoms of motor shells which are obtained with new small diameter wheels, as such a reduction necessitates increased attention in order to prevent trouble when wheels become worn. On a large number of roads it has been found that the clearances of one type of equipment are considerably less than for all others. There is no reason why the clearance should not be standardized at the minimum. This will simplify the inspection and it will have the further advantage that it will reduce the step height. The sizes of wheels used under old cars were seldom determined by the height and number of steps obtained and their effect on the traveling public. Today it is felt that the added attention required to operate small diameter wheels with small motor and gear clearance may be amply repaid by more satisfied riders.

Car Signs Should Clearly Give Definite Information

DESTINATION and route signs on cars should be made to serve a real purpose and attract additional patronage instead of diverting it to other channels. A regular patron of a particular car line pays little attention to the route and destination signs unless several different lines are routed by the particular point at which he boards the car. When he has to take an unfamiliar line the case is quite different. Then, too, the stranger in the city and the casual rider on a line expect route and destination signs to give clear, concise and intelligent information.

It is little wonder that a stranger pays ten to twenty times the price of car fare and takes a taxi in order to be rid of the inconvenience and annoyance of finding out if any of the particular cars he sees passing will take him somewhere near the point he wishes to reach. The railway will also be benefited much by having signs of such size and with a contrast in color so that they may be seen and read readily at a considerable distance. Lengths of stops are decreased if the passenger can get to the loading point before the car stops. It is unnecessary for the railway to buy new equipment to improve the sign conditions on its cars. Desirable changes can be made a part of the maintenance program.

Selection and installation of even the most excellent signs are insufficient in themselves. Deterioration is fairly rapid, particularly with the roller curtain type now so generally used. The writer recently boarded a car on which the destination sign was illegible at a distance of half a car length. Certainly a condition such as this does the company little good. Particular attention should be paid to the repainting and replacement of signs as frequently as is necessary to give clearly

This is the issue in January that is devoted essentially to maintenance subjects

and legibly the information wanted by the patron, so that he can signal the right car without hesitation and without delaying other cars by unnecessary stops.

Arranging Car Colors to Give Streamline Effect

ONLY in comparatively recent designs of car bodies has particular attention been given to the elements of design that result in pleasing curves and streamlines. Many cars have vestibule windows and panels of doors out of line with the side windows. Where a distinct contrast in the color of the paint used for sash and the adjacent car body is used the lack of streamlines is made more pronounced.

Several railways are using a cream or light yellow color for the sides down to the lower edge of the belt rail, and an orange or red below this. By carrying the light color around underneath the end belt rails the dividing line of the two colors is made to line up so as to produce the desired streamline effect. A study and use of such painting effects as this is sure to result in added attractiveness for the cars and maintenance costs are affected but slightly.

A Continuous Supply of Coal Is of Vital Importance to Railways

FEW, if any, commodities affect the electric railway industry more than does coal. The fuel used in its power houses is but one factor; there is also the rise in the cost of metals that must result with increased coal prices, to say nothing of the demand for higher wage scales that follow increased living costs, by reason of the higher price of fuel. So while the present strike in the anthracite mines affects many of us personally, it should be of particular interest to us as railway men.

In regard to the nation's lack of authority to deal with the coal situation President Coolidge, in his recent message to Congress, said: "At the present time the national government has little or no authority to deal with this vital necessity of the life of the country. It has permitted itself to remain so powerless that its only attitude must be humble supplication." He suggests as a means of regulation that "authority should be lodged with the President and the Department of Commerce and Labor giving them the power to deal with an emergency."

This raises the question as to whether an emergency should ever exist or whether regulation should be applied to avoid the possibility of an emergency. There is in this country a great supply of coal ready to be mined. There is a supply of labor more than sufficient to mine it as fast as it is needed. Why then should an emergency occur? There is no doubt that an emergency exists. There is already a considerable use of makeshift fuel substitutes and there are rumors of large coal importations from Europe. The present controversy affects the anthracite mines particularly, but the anthracite industry affects the entire fuel industry as surely as a complete failure of car service would cause a stampede to other means of public transportation and the demoralization of their service. Emergencies are liable to occur in any business. But they have come to be expected regularly in the coal industry. When an emergency exists much of the damage is already done. Action should come before the emergency begins to avoid the kind of crisis we are now facing.

We are all tired of over-legislation. But when the coal industry assumes monopolistic aspects by having the miners arrayed solidly on one side and the operators lined up solidly on the other, yet both restricting the supply and forcing up the prices, there is need for a little direction from the outside.

An attempt to regulate a commodity like coal would not be without its difficulties. Among the complications would be the question of whether such control should be exercised by the state or the federal government. The many interstate transactions would almost require some phase of federal control. Perhaps the nearest to a parallel to this is the ruling of the United States Supreme Court that gas transmitted from one state to another to be sold at wholesale comes under the regulatory powers of Congress, but that gas transmitted from one state to another and distributed to various retail customers comes under the jurisdiction of the state. Such regulation need not be a strict fixing of prices, but rather should provide a means of insuring a continuous supply of coal, and the prices would take care of themselves through the channels of competitive trade. Among the things to be considered would be a fair basis for wages, which is largely the cause of the present controversy.

No doubt the coal operators, and the miners too, would violently oppose such regulation. Yet in time they would profit by the stability that would be given to this industry, just as public utilities have become so stabilized financially that their securities are looked upon by the careful investor almost as favorably as municipal bonds. Let's stop having coal emergencies.

A Statement that Carries Its Own Encomium

REJUVENATION is a word that is being bandied about a great deal in electric railway circles these days. There have been many notable cases of properties that have been revitalized, but none in its way is more significant than that of the Brooklyn Rapid Transit. The evil day of that road was Dec. 31, 1918. It was an evil day in the sense that it marked the road being placed in receivership, but it was not evil in the sense of the good that has since followed.

Of course, it would have been better, perhaps, if the necessity had not arisen for such action, but since it did, the court and the receiver, Lindley M. Garrison, proceeded to work out the salvation of the road. How well this has been done is shown now by the fact that the common stock of the successor, the Brooklyn-Manhattan Transit Company, has been placed on a dividend basis in less than a year and a half after reorganization. It is a new company in spirit, in hope and in outlook, in charge of a progressive personnel, largely the same as the old one.

In the last year and a half \$8,500,000 has been spent for improvements and the directors have just authorized the expenditure of from \$4,500,000 to \$5,000,000 for the purchase of new cars. The company stands committed to the policy of being ready to deal with the city on the matter of additions to the rapid transit systems when the city is ready to deal with it. Under Hylan the officers were unable to get anywhere, but Chairman G. M. Dahl carried the fight to the ex-Mayor, much to the latter's discomfiture.

But that is done and gone. Just at this time two matters in connection with the affairs of the company

are of particular interest. One is the fact that the company has been able to do so well and the other is the stress put by Mr. Dahl on the probable future trend of financing for the company. His statement to the stockholders, which was widely quoted, sets forth the need for a balanced financial structure along the lines suggested by the committee on finance of the American Electric Railway Association, and would seem to indicate that the hope for the future is to finance by issuing junior securities. Moreover, Mr. Dahl's statement brought out forcefully the wide distribution of the securities of the company, showing as it did that only 8 per cent of the preferred and common stock is owned by those holding more than 100 shares each. The average number of shares per stockholder is 96. Mr. Dahl said that it is not only in the interest of investors in the common stock that they should have a return on their investment, but that it is in the interest of the public and the city. Then he proceeded in direct language to point out why. This was an excellent piece of publicity. To the initiated very little explaining needs to be done about a statement of earnings that shows operating revenue of \$18,636,971 for the five months ended Nov. 30, 1925, compared with \$17,788,580 for the similar period in 1924 and nets of \$2,514,802 and \$2,093,314 for these comparable periods. The figures carry their own encomium.

Public Utility Operation on Plan of a Regulated Monopoly Not Completely Understood

CLARENCE K. CROSSAN voted "No" to the Philadelphia Rapid Transit plan to purchase taxis. He cast the lone negative vote of the ten members of the transportation committee of the Philadelphia City Council. Fortunately for the progressive plans of the P. R. T. there were nine affirmative votes and the measure has been approved for city co-operation in the taxi co-ordination plan.

The principle back of Mr. Crossan's logic is the deplorable feature of his reasoning. "There is no such thing as a good monopoly," Mr. Crossan is quoted as saying, and thus the philosophy of a bygone age was revived. To him "monopoly" and "trust" still call to mind the incongruous monster of the past. Fortunately, there appear to be fewer Crossans each year who fail to realize that a monopoly under public regulation is the most economical means of providing public service, and that a monopoly under regulation is in reality not a monopoly in the sense that it has a strong-arm control of the industry.

Only in recent years and often by means of expensive receiverships is the country getting rid of the duplication of capital expenditures occasioned by competitive building of railway lines years ago. In more recent times we have had the experience of the dual telephone system in many parts of our country, to the aggravation of the merchants and business houses that were required to make a double expenditure for telephone service.

Our present national administration is tending strongly toward consolidation of the country's railroads into balanced non-competitive groups, always under the regulation of the I. C. C. The regulatory body created and controlled by a just and a wise public service company law gives to the public the advantage of non-competitive service by private capital, and protection against unjust practices and abnormal profits.

Some Advantages of Foremen Conferences

GROWTH of interest in the training of foremen is an encouraging sign of the times in electric railway circles. If the facilities for educational work on electric railway properties are limited, they may profitably be concentrated on the supervisory force, at least at the start. Foremen are in intimate contact with the workmen on one hand and the management on the other. They have the point of view of the workman, because in general they have been promoted from the shop or track forces. As foremen they are part of the management, because they have been transferred from "work jobs" to "responsibility jobs."

Experience with foremen conferences in many industries has shown a keen desire for training in foremanship. Most of the men, of course, have been good workmen, but many have been promoted to the position without much insight into its duties, responsibilities and opportunities. Their very promotion showed that they possessed qualities of leadership. Such qualities need to be developed. Efforts made to develop them meet with response.

At its December meeting in Boston the New England Street Railway Club witnessed a demonstration of a foreman conference, conducted according to a plan which has proved successful in the conducting of such conferences generally. The interest of the club in this demonstration was so keen, and its appreciation of the possibilities of the plan so genuine, that the committee on education of the American Association, which was in session in Boston at the time, was reinforced in its determination to push this form of educational activity in 1926. This decision is a wise one. If the committee can get the foreman-training idea over to electric railway managements throughout the country, and if these managements will exert initiative in learning how foreman conferences should be conducted, there will be a noticeable advance in this industry along educational lines during the coming year. The committee cannot do it all. It must have co-operation. It has no axe to grind; only the good of the industry is behind its efforts. Give the foreman conference a fair trial this year.

Study of Car Appearance and Comfort a Desirable Move

MOST promising as a sign of the advent of a new era in electric railway history is the creation of a sub-committee at the recent meeting of the equipment committee to study means by which the comfort and appearance of electric cars may be improved. The subject is most timely. That the task was self-imposed augurs well for its success. Equipment men have been accused at times of being "stand-patters" and satisfied with things as they are, but the starting of this study shows a commendable progressive spirit and the industry at large should co-operate in every possible manner to help the committee produce some worth-while results.

Just how far reaching the work of this committee will be only time can tell. It is apparent, however, that there is a wide field of endeavor open which has had little previous exploration. This study should supplement the investigations and work of other committees, with the result that the composite will be of lasting benefit to the industry.

Unifying the Transportation Features of Toronto Rolling Stock

More than 300 Cars Taken Over by the Commission from Private Companies Have Been Remodeled for Front-Entrance Operation—One-Man Cars Have Been Equipped with Automatic Rear Exits—Lights and Mirrors Are Designed to Insure Safety of Passenger Movement



Front-Entrance, Automatic Rear-Exit Car as Remodeled by Toronto Transportation Commission from Rear-Entrance, Pay-as-You-Enter Car

WITH the assumption in 1921 of the control and operation by the Toronto Transportation Commission of the street railway systems of the Toronto Railway and the Toronto Civic Railway, one of the major problems was that of bringing to some uniform design the various types of car inherited from these two organizations. After a careful and extended investigation it was decided to adopt the front entrance as standard for the system. Standardization in this respect would avoid the confusion caused by differently located entrances, it was thought, and the universal front entrance was considered to be helpful in furthering the speedy operation of the system under the prevailing conditions. After this had been decided the commission procured new cars of the Peter Witt type, and now has 350 of these in service. With 225 two-door and three-door trailers for use in the rush hours they handle the traffic in the most heavily traveled routes. More than 300 of the older cars have been remodeled.

Cars taken over from the Toronto Railway numbered 832, of which 348 are now in service and the balance, numbering 484, composed of old-fashioned double-truck motor cars with semi-inclosed vestibules, and a varied assortment of single-truck motor cars and trailers with semi-inclosed and open vestibules, have been scrapped. Some of these cars dated back to 1892 or beyond.

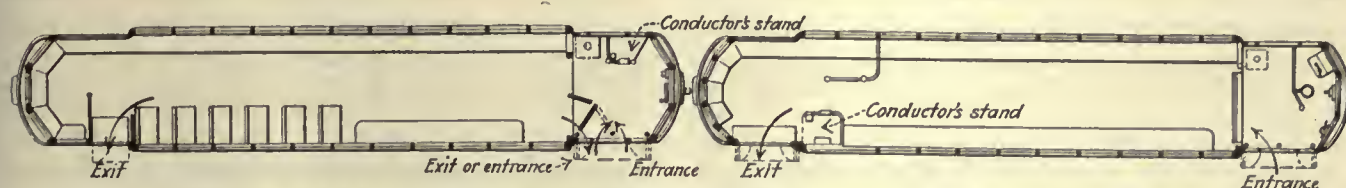
Some 70 cars were taken over from the Toronto Civic Railway, and with the exception of 25 Birney safety cars and eight single-truck, double-end cars they were of the double-truck, double-end, pay-enter type. These

cars were all of more modern design and in fairly good physical condition. All have been retained in service, but the double-truck, double-end, pay-enter type has been remodeled in a manner outlined below.

Of the 348 Toronto Railway cars retained in service, 215 have been or ultimately will be converted to the pay-leave design, as exemplified by the first car of the train shown in an accompanying illustration. One hundred have been rebuilt as one-man, single-end, front entrance and exit, rear treadle exit cars similar to the second car of the train. Ultimately the remaining 33 will be converted to motorized trailers for the six-motor trains.

In the pay-leave type the seating capacity has been increased considerably by extending the closed side longitudinal seats around the rear vestibule. The conductor's station is located at the rear end of the car body on the open side in a position to insure full control and safe operation of the exit door. A railing has also been installed, which, as is shown in an illustration, provides a considerable area of "prepaid accommodation." Because of its quick loading features this type of car is eminently suitable for handling the evening traffic peak when loading facilities are taxed to the utmost.

All cars rebuilt for pay-leave operation are similar in every respect in so far as the body, doors, conductor's location and seating arrangements are concerned. However, a group of 90 have been equipped with line and drum switches and automatic couplers, to enable



Entrance and Exit Arrangements on Cars Remodeled for Use in Six-Motor Trains. The First Car Seats 46 and the Second Car 48 Passengers

them to pull standard trailers. A second group of 33 will be equipped in a similar way in the near future to haul either a standard trailer or a motorized trailer. This will require the introduction of an additional drum switch to that required for standard trailer operation, and additional electric contacts on the coupler head. These drum switches are independently operated and designed to be foolproof, so that the operator, no matter what type of trailer he is picking up, must have the switches properly set to make the necessary connections for that particular type of equipment. If this is not done correctly, the line switch control circuit will remain open. The same applies when a car of this type is being operated as a single unit; if the drum switches are not thrown for unit car operation, the motors will remain inoperative. In the correct position for unit car operation, all the electric coupler contacts are dead, and similarly the exposed contacts are dead when hauling a standard trailer.

An auxiliary resistance also has been installed on this car for use only when running in a two-car six-motor train. This resistance is interlocked with the control, and is automatically cut out or in by the additional drum switch. Helical gears and pinions have been installed on the motors of these cars and the gear ratio altered to protect the equipment hauling trailer loads. This arrangement of the first car of the train makes it extremely flexible for various kinds of service. The third group, numbering 92, of this pay-leave design is equipped for unit car operation only and has no line switches.

Birney cars were introduced originally in Toronto by the Civic Railway, and were successful if not routed on heavy traffic lines. After careful observation of conditions it was decided by the commission that the operation of one-man cars was a practical proposition, provided that larger cars could be operated safely,



Separation of Township Fares and City Fares on This Route Necessitates Use of Two Fare Boxes

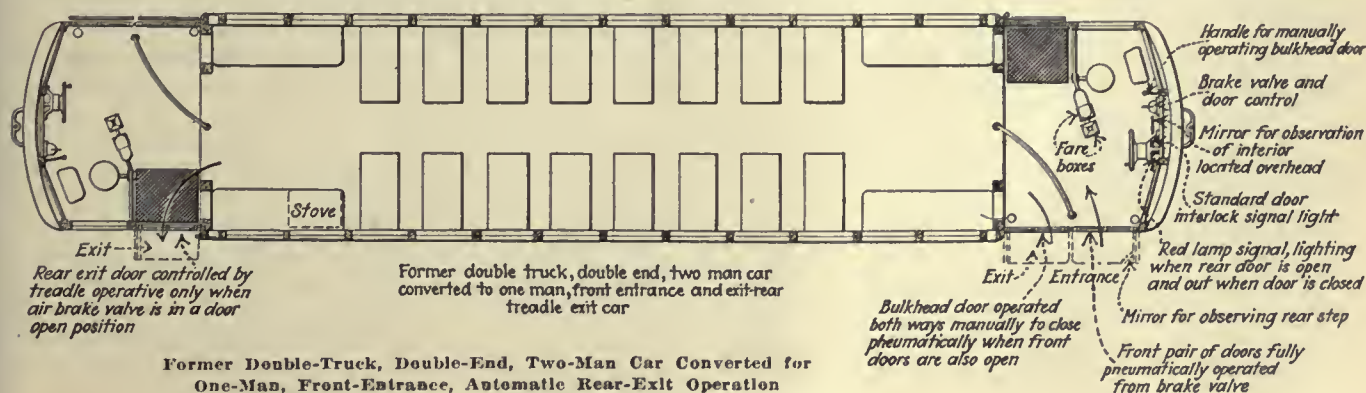
giving a much needed reserve of carrying capacity during the two acute daily traffic peaks. Reasonable frequency of service, it was also realized, would be economically impossible on many routes with the comparatively light off-peak traffic without one-man cars. Desire to make the service an attractive one made the management keen to evolve a satisfactory one-man car suitable for universal operation at all hours.

Evolution of the treadle-operated door paved the way for the elimination of all the principal objections previously apparent in one-man cars with front-entrance and exit doors only. Eventually the type of car shown in an accompanying illustration was devised, of which there are now 100 operating in Toronto. This group, with the previous three, accounts for 315 of the original pay-as-you-enter type taken over from the Toronto Railway.

Seats as rearranged accommodate 51 passengers as against 38 seats available in these cars previous to alteration. The width of the cars permitted cross seats to be placed only on one side, and the longitudinal seat on the closed side was continued around the rear vestibule.

This car is equipped with full safety control, with no foot valve, and a line switch which provides electric door interlock. The elimination of the foot valve was to compel the operator to carry out instructions and complete all major transactions with boarding passengers before starting the car. The front-entrance door has full pneumatic operation from the brake valve, and the bulkhead or exit half is operated both ways manually, but only after the forward door is open. National Pneumatic Company door and treadle equipment is used.

Closing the front door also pneumatically closes the exit door. This gives a measure of selective door control with one engine, without the use of a selector valve. Operation of the rear treadle door is initiated



Former Double-Truck, Double-End, Two-Man Car Converted for One-Man, Front-Entrance, Automatic Rear-Exit Operation

by the brake valve to an electro-magnetic valve, which, when a passenger stands on the treadle, completes the magnetic valve circuit, permits door opening pressure to enter the valve puller and this operates the door engine rotary valve. A second electro-magnetic valve in series with the other, with a ball check valve in the valve puller cylinder pipe, puts the closing of the door in control of the passengers alighting from the car.

On these cars an additional position has been given the M-28 brake valve by a minor alteration. This is ahead of the standard door-opening position. When the brake valve handle is moved to the new position it



Treadle and Step of Automatic Rear Exit on
Toronto One-Man Cars

causes the rear treadle-operated door to become operative, the front door remaining closed. This arrangement permits of selective operation of the rear door.

In addition to the standard control signal lights, the operator has similar standard red lights which are illuminated so long as the rear treadle door is open. Five lights are also arranged on the rear vestibule to illuminate the treadle and step synchronously with the operator's red signal lights. Two of these are red and located outside the rear vestibule, giving warning to all vehicular traffic that the rear door is open and that passengers are about to alight. A mirror is mounted on the outside of the front-entrance door in such a manner that the operator sees plainly the rear-exit step and door when open. A second mirror is installed above the center window of the front vestibule directly in front of the operator to give an interior view of the car.

Such cars have been in service since November, 1924. Extension of the use of one-man cars in Toronto was facilitated by the adoption of the front entrance as standard on all cars of the system. Cars of this type now operate with capacity loads, partly or wholly over the same route with cars of other types, in some cases through the busy downtown area, without any confusion or doubt as to boarding location. Speed of loading, as was anticipated, is somewhat slower than with other types, but it is easily the speediest in unloading of any car operated in Toronto, and no trouble has been found in maintaining schedule speed. Where routes equipped with this car coincided with routes equipped with two-man cars, no interference has developed in maintaining the running time of other two-man cars.

Remaining Toronto Railway cars to be converted number 33. These will be operated as the second cars of the six-motor trains. This second car is front entrance and exit, with rear treadle exit, and, so far as seating arrangements and general layout are concerned, is similar to the one-man double-truck car type described. A movable barrier permits the conductor to use both doors at the front for entrance, as the traffic movement requires. This operation of the barrier materially assists in speeding up the loading and unloading of the car. This car is equipped with two motors of similar type and gear ratio to those used in the first car of the train. Both motors are installed in the forward truck. There is also a trolley pole, circuit breaker, reverser switch and resistor unit included in the equipment. When the car is coupled to the leading car the trolley pole is hooked down to the roof, the circuit breaker opened and the reverser switch set in forward position. When it is desired to move this type of car in yards or buildings, or to make up trains, the trolley pole is placed on the wire, the reverser switch is set in the desired direction of movement, and by means of the circuit breaker and staffless hand brake well controlled and safe movement is secured.

Control of both front doors and the rear treadle-operated exit door is from the conductor's station. The front door is equipped with a pneumatic door engine operated in the usual way by lever and rod to engine valve. The rear treadle exit door is operated by a switch of the push-button type, which, when in position for train movement, closes the train control circuit and opens the circuit in which is connected up the main electro-magnetic valve of the rear treadle exit door engine, keeping it inoperative while the train is in motion. When the train is at rest, and it is desired to have the rear exit door become operative, the door control switch is pushed to rear door operating position. This movement opens the train control circuit and connects the break in the main electro-magnetic valve circuit. Depression of the treadle completes the circuit and the exit door will open. An auxiliary electro-magnetic valve is installed in a manner to prevent the door from being slammed in the face of alighting passengers while there is weight on the treadle or step. This feature is independent in operation irrespective of any action of the conductor in pushing his control switch while passengers are alighting. This auxiliary valve application, however, is not effective on the valve puller cylinder until after the permissive switch movement is initiated by the conductor in charge.

Opening of the door is controlled by the conductor and the closing of the door is controlled by the alighting passengers. Due to control interlocks the trains cannot be moved until the doors are all closed and proper circuits established. Red signal lights located in front of the motorman of the train and the conductor of the second car become illuminated while the rear treadle door of the second car is open, and by means of another special colored signal light the conductor of the second car is informed when the motorman is ready to proceed. This feature is also standard on all trail cars. The single-stroke bell and buzzer system is common to both types of trail cars.

Of the 70 cars taken over from the Toronto Civic Railway, 37 were of the double-truck, double-end, pay-as-you-enter type with rear entrance and exit and front exit doors, all manually operated. After the pronounced success of the one-man, double-truck, single-end front entrance and exit and rear treadle exit cars, it was decided to convert 28 of these 37 to cars of the one-man, double-truck, double-end, front entrance and exit, rear treadle exit type. There are two groups of this type, and although one seats 44 passengers and the of equipment in both vestibules is essentially the same in plan and general layout as shown. The arrangement of equipment in both vestibules is essentially the same as in the single-end car, except that the protective barrier beside the treadle is extended at an angle to the center of the car and used to support the operator's seat, fare box and change tray.

As it was desired to reduce the operator's duties to a minimum when changing from one end of the car to the other at terminals, the Nichols-Lintern red and green lights were interlocked in the controller by means of small additional switches fitted to each reverse drum. These switches are so connected that the operator in removing his controller handle and reverse lever, and adjusting them at the other end for forward movement, automatically completes or breaks the circuits to suit the direction of car movement. The Nichols-Lintern red light is grounded at the off position on the main drum of the controller at each end, and the latter part of this same circuit is used for completing the treadle electro-magnetic valve circuit at the respective ends. When the brake valve handle is removed the corresponding treadle-operated doors are made non-operative pneumatically. Interlocking of the electro-magnetic valves of the treadle door in the controller also makes them non-operative electrically in a semi-automatic manner to suit the particular direction of car movement.

On one group of fifteen of these 28 cars which is operated on a route having a periodic heavy volume of traffic loading and unloading, especially at one terminal, a ground or street conductor's control of the treadle-operated door has been designed and installed. Operation is by means of a special key which is applied by the street conductor to a concealed air cock located below the vestibule framing adjoining the door. The opening or closing of this cock opens and closes the treadle-operated door and is entirely independent of any movement by the operator on the car or a passenger stepping on the treadle. The air cock for street conductor's control of the door is connected to the main reservoir pipe, and from this to the valve puller cylinder pipe between the ball check valve and the main electro-magnetic valve. A branch pipe also goes to a double contact disk type pneumatic switch, and just ahead of

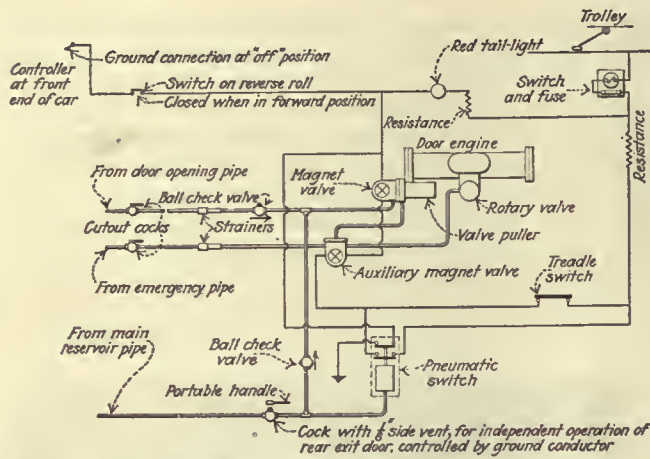
this branch a ball check valve is fitted to prevent air acting on the pneumatic switch in the normal operation of the door. Closing of this pneumatic switch short circuits the contact switch below the treadle plate, and the other contact completes the electro-magnetic valve circuit to separate ground. When the ground conductor opens the special cock, air is admitted to the valve puller cylinder pipe and simultaneously, by means of the pneumatic switch, the electro-magnetic valve circuit is completed, energizing the valves, and air is admitted to the valve puller. The door will then open for alighting or boarding passengers. To close the door, the



Twin Fare Boxes Are Used to Permit Separate Accounting on One-Man Cars on Weston Road

street conductor simply closes the cock with the special key, and by reason of a small side vent in the cock, air is vented from the pneumatic switch, and the whole apparatus is promptly and automatically ready again for normal operation.

The equipment of this latter group of cars was evolved with a view to operation on a line that extends from a terminal at Keele and Dundas Streets in Toronto—West, in a northwest direction to the city limits at Northlands Avenue. From the city limits the line proceeds through the township of York, via the Mount Dennis district, to the north end of the town of Weston. The section in York and Weston was until recently owned and operated by the Toronto Suburban Railway, latterly acquired by the municipalities through which it passes. Control and management was vested in the Township of York Railway. The whole line at one time was owned by the Canadian National Electric Railways, but ownership of the city section some years previous passed into the hands of the Toronto Transportation Commission. The length of the line to the



Pneumatic and Electric Details of Street Collector's Control on Toronto Car Rebuilt with Automatic Rear Exit

city limits is 1.11 miles and from there to the north end of Weston 3.54 miles, a total distance of 4.65 miles.

The Township of York Railway, associated with the other municipalities, has made a service-at-cost agreement with the commission, for the supply, operation and maintenance of the necessary rolling stock to equip this new co-ordinated through line. Revenue from the two zones must be kept separate, owing to the receipts being subject to an independent accounting, and so means had to be devised to keep separate the fares collected in the two zones. At each end of the car there are two fare boxes, painted contrasting colors, adjoining the operator's position and the passenger stream, and so mounted that either one or the other can be revolved into position for deposit of fares, depending on the zone of travel. The mouth of the box that is out of use is on the inside of the barrier and further concealed and blocked by the change tray adjacent.

On leaving the Toronto terminal, the red (or T.T.C.) fare box is in position, and the car proceeds to the city limits operating pay-as-you-enter, with passengers entering by the forward half of the front door and alighting by the rear or bulkhead half of this front door, or by the rear treadle exit door as desired. T.T.C. fares in this zone are collected on the outbound journey when passengers enter. On arrival at the city limits and after all passengers have alighted the black (or York Township Railway) farebox is moved into position, and the operator makes the rear treadle-operated door inoperative by closing the cut-out cock above mentioned. The car proceeds to the Weston terminal on the pay-as-you-leave principle, and all

passengers desirous of alighting must deposit fares on leaving by the front door. Boarding passengers use the bulkhead half of this door, or both halves can be used for this purpose if no passengers are alighting. Township fares are collected only when leaving the car in this zone when outbound from the city. Inbound to the city the method is reversed.

During the traffic peak periods on this line, inbound in the morning and outbound in the evening, the heaviest loading and unloading occurs at the Toronto terminal. It is here that the street conductor's control of the rear treadle exit door on these cars has proved of great assistance as an auxiliary fare collecting point. It has enabled these one-man cars to load and unload quickly and maintain prearranged schedules quite easily.

Track Reconstruction in Sheboygan, Wis.

Modern Methods Employed by the Wisconsin Power & Light Company in the Rebuilding of Its Carhouse and Eighth Street Tracks

BY ALF A. OLDFIELD

Engineer Maintenance of Way Wisconsin Power & Light Company

RECONSTRUCTION of the entrance tracks to the carhouses on South Eighth Street and the reconstruction of $\frac{1}{2}$ mile of double track and $\frac{1}{4}$ mile of single track has advanced to a considerable extent the reconstruction program of the Wisconsin Power & Light Company in Sheboygan. One of the illustrations shows the completed six-track entrance to the carhouse from Eighth Street, including the special work required and the method of bringing the tracks from the street into the carhouse yards. The plan adopted eliminates the curbs, gutters and separate sidewalks, allowing the company's buses to enter the carhouse with ease.

Since service was maintained during construction, the plan of placing the operating track to one side was adopted, as shown in another illustration. A third picture shows the method of connecting a curve to a branch line during construction, while a fourth illustrates one completed track of the double-track line and the second track which has just been brought to grade and aligned ready for concreting.

The special work was built according to the engineering standards of the company and was supplied by the Lorain Steel Company. Solid manganese switches equipped with drain boxes were used, as were



Views Showing Reconstruction Work at Sheboygan by the Wisconsin Power & Light Company. At Left is the Temporary Track Used During Reconstruction. At Right is a Stretch of Finished Track Alongside of a Short Section Ready for Concreting



Reconstructed Entrance to Carhouse of Wisconsin Power & Light Company's Property at Sheboygan, Wis. Sidewalk, Curb and Gutter Have Been Eliminated to Provide Easy Access to Yards for the Company's Buses

hard center mates and frogs. The curves were built with section 140-468 guard rail on the inside and 93-507 T-rail on the outside. Under the special work 6-in. x 8-in. timbers were placed, with 8 in. of ballast under the ties. Reinforced concrete pavement is placed on top of the ties and the rolled ballast, which after tamping partially fills the space between ties.

For the straight track a relayer rail, section 80-362, originally rolled for the Victorian Railways of Australia, was employed, this rail having been recovered from the railroad that previously was in operation between Oshkosh and Omro, Wis., and which was abandoned during the year 1924. This rail showed very

little wear. The straight track is supported on Dayton Resilient ties set in concrete.

For experimental purposes one track was built with Carey elastite rail filler and the other track without any filler. The result of this experiment indicates that the track in which the filler was used is considerably quieter in operation than the one without rail filler. The difference is so marked that it is planned to specify this rail filler in other reconstruction jobs. Rail joints on straight track were welded by using Alumino-thermic welds.

It is intended to complete the reconstruction of the Eighth Street line north of the carhouse this year.



Temporary Crossing of Branch Line During Reconstruction Work at Sheboygan, Wis., Used While Rebuilding Main Line Tracks on Eighth Street

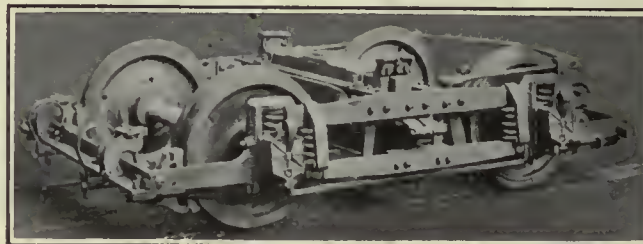
Modernizing Old Trucks

Weight Reduced 1,400 Lb. per Car by Incorporating Late Truck Improvements to Revamp a Type Purchased Nineteen Years Ago by the Lehigh Traction Company

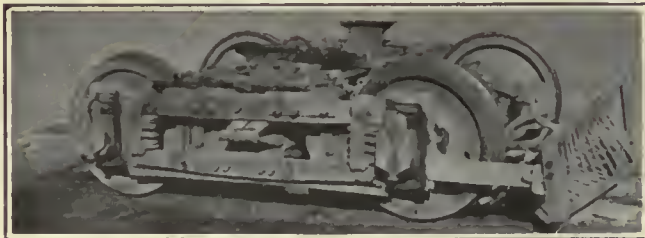
BY JAMES W. BROWN

Superintendent of Shops Lehigh Traction Company, Hazleton, Pa.

THROUGH the use of a number of late truck improvements some Brill type 27-E-1 trucks which were placed in service by the Lehigh Traction Company nineteen years ago have been reduced in weight approximately 700 lb. per truck or 1,400 lb. per car from that of the original type. The improved construction has also increased safety of operation and reduced troubles in service and maintenance costs. About two years ago the brake rigging on 24 cars was changed from an outside to an inside-hung type. This remodeling included the addition of necessary gusset plates, half-ball hangers, etc. This change reduced the weight of each truck 250 lb., or 500 lb. per car, and did away with twelve



Original Type of Brill 27-E Truck Purchased Nineteen Years Ago



The First Step in Remodeling Was Taken Two Years Ago, When Brake Rigging Was Changed to Inside Hung Type, with a Saving of 250 Lb. per Truck

brake rods per car. A further remodeling is now being carried out which consists of applying Brill twin-swing links, steel bolsters, bolster guides, semi-elliptic springs, and a graduated spring system. This change has further reduced the weight 450 lb. per truck or 900 lb. per car. Twenty trucks have already been changed and the four remaining will be completed shortly.

Accompanying illustrations show the truck as originally purchased, the truck after its first rehabilitation, and the truck as now being modernized. To make these changes, all truck parts are dismantled except the side bars, end angles and transoms. Rivets and bolts are tested carefully and if any are found loose they are removed, the holes are plugged and redrilled, and new rivets and bolts inserted. Before riveting, the trucks are carefully squared. All corner brackets that are worn or broken are renewed, and any holes in the bolster transom that interfere with holes in gusset plates to be added are plugged, redrilled and reamed to fit turned bolts, which are used to secure the gusset plates to the transom. When the gusset plates are in place on the truck frame, holes in the side bars are drilled and reamed for 1½-in. turned bolts.

In order to apply the twin-swing links, it is necessary to dress out the truck frames with an air chisel, to fit

the swing link top casting. This casting is shrunk onto the truck frame and a ½-in. hole is drilled through the frame and casting, into which countersunk rivets are applied. After the gusset plates are finished and bolted to the frame, the plates have a hole 1½ in. in diameter drilled for the bolster guide pin. New bottom tie rods are installed which are made of 2½-in. x 1-in. flat machine steel. This flat portion is carried out 7 in. from each end and then welded to a 1½-in. round steel rod. The first portion acts as a safety hanger for the elliptic spring in case this should break.

One of the principal reasons for modernizing these trucks at this time comes from the fact that ten wooden type car bodies are being replaced with late all-steel type. These new bodies provide a seating capacity of 70 as compared with 46 for the wood type. All this is accomplished without increased weight in the car body.

At the time that the first changes in the trucks were made about two years ago, steel pilots were installed in place of wooden pilots previously used on these cars. This produced a weight reduction of 110 lb. per truck or 220 lb. per car. In the construction of these pilots particular care was taken to make them interchangeable, so that their removal



The Modernized Truck as Now Completed with a Total Truck Weight Reduction of 700 Lb. Has Improved Riding Characteristics

and replacement take but from fifteen to twenty minutes.

The work of modernizing these trucks is carried out by the regular shop forces and so a definite schedule cannot be followed. Four men are used in making these changes, and in addition one air brake inspector oversees the work and two machinists, one acetylene welder, one blacksmith and helper and one electrician and assistant take care of the necessary work in their particular lines. The cars are brought in for this general rehabilitation at a time when the wheels need turning. At the same time general repairs are made to the motors, brake rigging and air equipment. The cost of rehabilitating the trucks, together with the other repairs made, averages \$830.

The shop in which this work is done has but one track with a pit running its entire length. Work of rehabilitation is done on this track. A 15-ton crane operates the entire length, and in addition, two 30-ton hydraulic jacks are used for lifting the car bodies from the trucks. The shop equipment used consists of a 60-in. lathe on which all wheels are bored and turned, a 24-in. lathe, a 14-in. lathe, one drill press, one twist drill grinder, one wheel for general grinding, a shaper, drill, power hacksaw, bolt and pipe cutter, and a 400-ton wheel press, two air and one electric drills and an air riveter.

Safe Methods of Operating Electric Track Switches

Thorough Instructions Given to Motormen in Rochester Have Reduced Troubles from Throwing Switches Under Rear Trucks of Preceding Cars

By Leon R. Brown

Director of Safety New York State Railways, Rochester, N. Y.



Location of Cut-In Pan, Cut-Out Pan and Pole Box. The Rear Truck of the Leading Car Has Passed the Track Switch

WHILE an electric railway car operator knows that if he passes the "cut-in pan" with power off the switch will throw for the straight track and if he passes with power on it will throw for the curve, still he does not know why it acts nor why it sometimes does not work. Since some difficulty was experienced on the Rochester Lines of the New York State Railways from motormen throwing switches under the rear trucks of preceding cars the safety director prepared charts and diagrams and gave a series of talks to the men at the various carhouses. At these conferences the men were encouraged to discuss their problems and to tell their experiences. Many valuable things were learned.

Two posters, copies of which are shown herewith, were prepared. One of these shows the general layout of an electric switch installation giving the location of the "cut-in pan" and the "cut-out pan" on the trolley wire and the track switch under the "cut-out pan." The poster also explains what not to do and why not to do it. The other poster shows in detail a diagram of the apparatus and explains how it operates. Of course it was not expected that many of the men would be interested in the technical manner in which the switch operates, but in order that they might understand the reason why they must operate slowly on the pan and why they must do other things, the explanation was given. It was surprising how many of the men were interested in

the technical description of the operations of the electric switch.

Another line drawing shows a detail of the "cut-in pan" and just how the trolley wheel bridges the gap between the contact pieces, completing the various circuits. The first contact determines whether the car is going to take the curve or the straight track; the second throws the switch, while the last locks it by breaking the circuit, thus preventing another car from throwing the switch until it is unlocked by a car tripping the cut-out pan.

The relays, coils and resistances are on the pole at the curb. The wires come overhead from the trolley and underground from the switch. The "cut-in pan," which is on the trolley wire about 60 ft. back of the switch point, is about 4 ft. long. As the diagram shows, it is not in contact with the trolley wire, which passes over it. The "cut-in pan" itself consists of one long contact strip on one side and a series of shorter contact strips on the other side, each of which is insulated from the others. When the trolley wheel passes over the "cut-in pan," one flange comes in contact with the long strip, while the other flange comes in contact with the series of shorter strips, closing the circuits between them. This operation takes place whether power is on or off. When the trolley wheel crosses the cut-out pan it acts as a switch and closes and opens several electric circuits in the short interval it takes to cross this pan. These

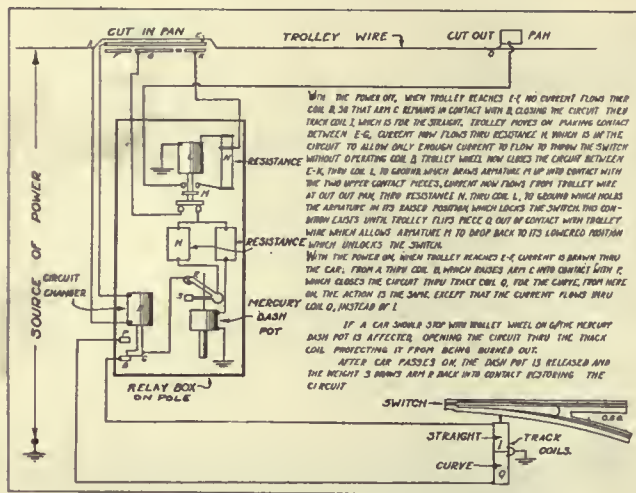


Diagram of the Switch-Throwing Circuits

operations always take place in exactly the same sequence. The opening and closing of these circuits energizes the magnets on the switch and throws the switch point.

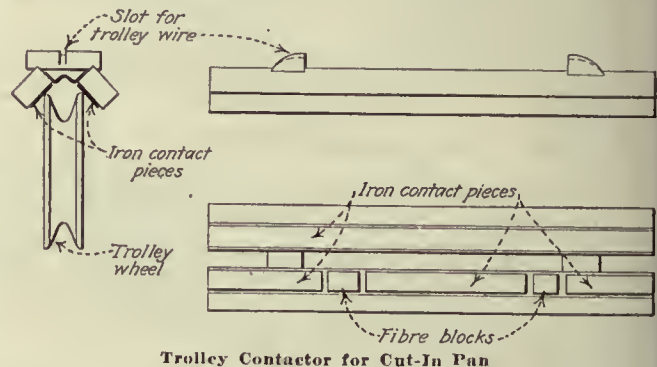
The switch point is thrown to the curve or to the straight according to whether the controller is on or off when the trolley wheel passes across this pan. If power is turned on or off at any time when the trolley wheel is on the pan it is probable that the switch will not be operated as intended. It may not throw, it may reverse or it may be left unlocked, depending on which contact point the trolley wheel touched when the power changed. This doubtless explains many of the queer stories which are told of the failures of electric switches to operate properly. If the car is going too fast while passing over the "cut-in pan" it readily can be seen that not enough time will elapse between the various operations. The chances are that the switch will not operate properly. There is also danger of injuring the complicated mechanism. Speeds of 3 to 4 m.p.h., or about the rate a man would walk, are approximately correct for passing under the "cut-in pan."

The last operation, as the trolley wheel leaves the cut-in pan, is to lock the switch so it cannot be thrown until the car passes the cut-out pan. This latter is merely a flip on the trolley wire, which is tripped when the trolley wheel passes under. The locks and cut-out

pan are not on the electric switches in Syracuse and Utica and there seems to be a misunderstanding about them by the men in Rochester. Nearly all the men were under the impression that by this arrangement they could not throw a switch under a preceding car. It was the principal purpose of these talks to explain that it was possible to throw a switch under a preceding car and what must be done to avoid doing so. The only safe rule to follow in order to avoid throwing a switch under a preceding car is not to allow the trolley wheel to pass the cut-in pan until the rear trucks of the preceding car have crossed the switch point.

There are two conditions where it is possible to throw a switch under a preceding car. If car No. 2 has come under the cut-in pan before No. 1 has gone under the cut-out pan car No. 2 is left unprotected, because when car No. 1 goes under the cut-out pan the switch is left unlocked, thus permitting car No. 3 to throw the switch under car No. 2 if it comes under the cut-in pan before No. 2 has passed the switch.

The other condition where a car following too closely can cause a split switch is with a trailer train. When the first car passes the cut-out pan it leaves the switch

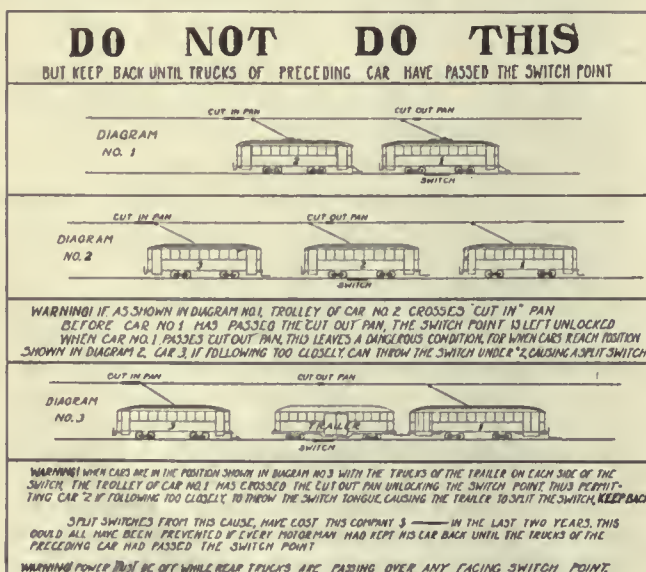


Trolley Contactor for Cut-In Pan

unlocked. The car following the trailer train will of course throw the switch under the trailer if it comes under the pan too soon.

There was much discussion as to how many points of power were necessary in order to throw the switch. The old motormen seem to have learned by experience just how many were necessary for the different types of cars. On the ordinary four-motor car usually two points of power will throw the switch. On a two-motor car at least four points are necessary. To throw a switch which is on a down grade it is necessary to bring the car nearly to a stop on approaching the "cut-in pan" and then throw the power on. This prevents crossing the cut-in pan at too high a speed and insures enough current to throw the switch.

Another point brought up was that sometimes the combination of electric heaters, air compressor motors and lights produced enough current to throw the switch even with the controller off. The magnet coil which selects the curve or the straight position for the switch point has an adjustment so that ordinarily it cannot throw the switch except by power from the controller. Adjustments are made every spring and fall to compensate for heater and light current. However, in the early fall and late spring, when the electric heaters are used for only a short time morning and evening, the switches may not be adjusted and motormen should be cautious. On the interurban cars it usually is necessary to cut off the heaters and air motors when passing electric switches. Study of the electrical operation of switches indicates that the apparatus is quite delicate.



General Layout of Equipment for an Electric Switch Installation

Co-ordinated Bus Service for Cincinnati

Routes Proposed by Cincinnati Street Railway Designed to Supplement Existing Rail Lines
—Crosstown Service to Facilitate Travel in City—Express to Reduce
Time to Outlying Communities

CO-ORDINATED bus and rail routes which will give maximum transportation service with minimum duplication of facilities is the principal objective in the plan recently submitted to the City Director of Street Railroads by the Cincinnati Street Railway. In a letter accompanying the formal application for a permit to operate buses, which was abstracted in the Dec. 19, 1925, issue of *ELECTRIC RAILWAY JOURNAL*,

sections of the city and suburbs. These are of three general classes: (1) Crosstown routes; (2) express routes to cut the time to outlying sections where ample local service is now provided by street cars; (3) feeder routes reaching districts not adequately provided with street car service.

In his letter to the director of street railroads President Draper carefully outlined the principles on which



Eight Bus Routes Will Give a High-Speed Service Supplementing the Street Cars in Cincinnati.
The Arrow Points Show Where Express Operation Begins

NAL, page 1091, President W. A. Draper outlined the advantages to be obtained, as follows:

1. Provide the beginning of a system of motor bus operation which may be extended as later warranted.
2. Formulate present plans with a view to their adaptability to the future.
3. Provide service where there is a lack and a need of it.
4. Avoid disturbing existing transportation facilities more than is necessary to provide the additional facilities considered needful.

The initial bus system, which is shown on the accompanying map, comprises eight routes to serve various

the plans for a co-ordinated transportation system are based. The advantages accruing to the community from this co-ordination of rail and bus are pointed out. While recognizing these advantages, he proposes a careful separation of bus and railway accounts for the purpose of fixing rates of fare on the buses that will provide a revenue commensurate with the character of service rendered. Mr. Draper covered these principles as follows:

It is believed that the beginning of a bus transportation system has been worked out that will be of distinct advantage to the communities served and yet will be sufficiently remunerative not to add an unwarranted

burden on the hundreds of thousands of street car riders who will continue to be so served. It has not been forgotten that the motor buses now proposed to be put on the streets will become a part of the whole transportation system.

Due regard has been given to the fact that while some are attracted to the newer type of transportation, there are many to whom the lower street car fare will always be a consideration. The recent reduction by which 5 cents is saved on every three rides should not be endangered by motor bus operations that would add unduly to the operating cost under the service-at-cost franchise.

BUSES TO PAY OWN WAY

Therefore a separate and accurate system of accounting will be kept that it may be known if the motor bus operation is paying its own way; and if it does not do so it is believed that the patrons of the motor bus service will be willing to pay such a rate as the city may find necessary to make it self-supporting.

It is believed that the express or preferential service proposed will be of distinct advantage. The argument advanced in favor of motor bus service is that it is a time saver. The greater the distance to be covered the more possible is the saving of time. On some of the shorter bus lines now operating there is actually no saving in time over street car operations, while on some of the longer lines the saving in time is appreciable.

A study indicates that there are points within a certain distance from the center of the city where prospective passengers will ride either the car or the motor bus that comes first. Applying this experience, it is proposed to operate the longer radial lines for the benefit of those outlying communities that are far enough from the center of the city to make such service desirable.

The two crosstown lines will meet a need that has long existed. Route E, the Clifton-Hyde Park line, will connect the residential suburbs indicated by the name, as well as Corryville, Avondale, Evanston and Norwood, and will also offer a direct line to the University of Cincinnati, Hughes High School and the other institutions in the same neighborhood. The Cumminsville-Oakley line will tie those suburbs and Winton Place, Ivorydale, St. Bernard, Bond Hill and Norwood, with the several factory and residential districts in those sections.

FUTURE NEEDS CONSIDERED

It will be apparent that the system of motor bus operations, of which this is a beginning, will lend itself to a development of transportation facilities of all forms. While motor bus transportation from its flexibility is generally considered as quite easy to change or discontinue in one section or another, nevertheless it should not be established unless it is reasonably certain that it can be continued. The operations now proposed are all planned to take care of future needs as well as present, and there is probably only one line proposed, the Cumminsville-Oakley line, that will not meet a continuing need. The operation of the rapid transit line in the future may render the continued operation of this line unnecessary. All of the other lines but two can be operated as feeders to the rapid transit line if it is so decided.

The four radial lines—A, B, C and D on the accom-

panying map—are to be express lines. Between the business district and the arrow marks shown on the map inbound buses will stop only to discharge passengers, and outbound buses will stop only to pick up passengers for points beyond the limits indicated by the arrows.

A fare of 10 cents for buses inside the city limits is contemplated. On lines which extend beyond the city lines an extra 10 cents will be charged. Free transfers will be issued from buses to cars at all intersections. Transfers will also be issued from cars to buses on payment of the full bus fare of 10 cents instead of the car fare of 8½ cents. Where two bus lines intersect transfers will be issued between them free.

DETAILS OF ROUTES

The various routes proposed, together with the principal features of their operation, are outlined below. It is planned to use 29-passenger single-deck buses for all routes.

Route A (Oakley-Mariemont).—From Government Square to Main Street, to Eighth Street, to Gilbert Avenue viaduct, to Gilbert Avenue, to Windsor Street, to Kemper Lane, to McMillan Street, to Woodburn Avenue, to Madison Road, to Plainville Pike, to Wooster Pike, to Mariemont town center. Returning on Wooster Pike to Plainville Pike, to Madison Road, to Woodburn Avenue, to McMillan Street, to Kemper Lane, to Windsor Street, to Gilbert Avenue, to Gilbert Avenue viaduct, to Eighth Street, to Walnut Street, to Government Square.

Number of buses—Nine.

Schedule—Non-rush hours, every twenty minutes from Government Square to the Mariemont town center; rush hours, every ten minutes from Government Square to Oakley, and every twenty minutes from Government Square to the Mariemont town center.

Fare—Ten cents from Government Square to Madison Road and Gomien Street, Madisonville, and between intermediate points; 10 cents from Mariemont town center to Madison Road and Dunbar Place and between intermediate points on this bus line only without transfer privilege, and 20 cents between all other points.

South and west of Madison Road and Observatory Avenue inbound buses will stop only for the purpose of discharging passengers boarding buses north and east of that point, and outbound buses will stop only for the purpose of receiving passengers destined beyond that point.

Route B (Bond Hill-Lockland).—From Government Square to Main Street, to Ninth Street, to Sycamore Street, to Reading Road, to Paddock Road, to Seventy-third Street, to Carthage Avenue, to Springfield Avenue, to Wyoming Avenue, to Benson Avenue, to Central Avenue. Returning on Benson Avenue, to Wyoming Avenue, to Springfield Avenue, to Carthage Avenue, to Seventy-third Street, to Paddock Road, to Reading Road, to Sycamore Street, to Ninth Street, to Walnut Street, to Government Square.

Number of buses—Seven.

Schedule—Every twenty minutes during non-rush hours, and every fifteen minutes during rush hours.

Fare—Ten cents from Central Avenue, Lockland, to B. & O. crossing, Bond Hill, and between intermediate points on this bus line only without transfer privilege; 10 cents from the Cincinnati-Wyoming corporation

line to Government Square and intermediate points, and 20 cents between all other points.

Express operation south of Reading Road and Dana Avenue.

Route C (Westwood-Cheviot).—From Government Square to Main Street, to Sixth Street, to Race Street, to McMicken Avenue, to Mohawk Place, to Central Avenue, to Harrison Avenue, to the Harrison Avenue viaduct, to State Avenue, to Harrison Avenue, to the Cleves-Bridgetown Pike. Returning on Harrison Avenue, to State Avenue, to Harrison Avenue viaduct, to Harrison Avenue, to Central Avenue, to Mohawk Place, to McMicken Avenue, to Race Street, to Fifth Street, to Government Square.

Number of buses—Six.

Schedules—Non-rush hours, every twenty minutes; rush hours, every 15 minutes.

Fare—Ten cents.

Express operation east and south of Beekman and Harrison Avenues.

Route D (Price Hill).—From Government Square to Main Street, to Sixth Street, to Race Street, to Ninth Street, to McLean Avenue, to Eighth Street viaduct, to Eighth Street, to the Price Hill inclined plane, to Matson Place, to Price Avenue, to Woodlawn Avenue, to Warsaw Avenue, to St. Lawrence Avenue, to Rosemont Avenue, to Glenway Avenue, to Overlook Avenue, to Rapid Run Pike. Returning on Rapid Run Pike, to Glenway Avenue, to Rosemont Avenue, to St. Lawrence Avenue, to Warsaw Avenue, to Woodlawn Avenue, to Price Avenue, to Matson Place, to the Price Hill inclined plane, to Eighth Street, to the Eighth Street viaduct, to McLean Avenue, to Ninth Street, to Race Street, to Fifth Street, to Government Square.

Number of buses—Five.

Schedule—Non-rush hours, every fifteen minutes; rush hours, every ten minutes.

Express operation east of Eighth Street and State Avenue.

Fare—Ten cents.

Route E (Clifton-Hyde Park).—From Clifton Avenue and McMillan Street on Clifton Avenue, to Glenmary, to Vine, to Erkenbrecher Avenue, to Burnet Avenue, to Rockdale Avenue, to Reading Road, to Dana Avenue, to Montgomery Road, to Williams Avenue, to Floral Avenue, to Robertson Avenue, to Duckcreek Road, to Edwards Road, to Erie Avenue. Returning via the same route.

Number of buses—Nine.

Schedule—Non-rush hours, every fifteen minutes; rush hours, every ten minutes.

Fare—Ten cents.

Route F (Cumminsville-Oakley).—From Knowlton's Corner on Spring Grove Avenue, to Murray Avenue,

to Laidlaw Avenue, to Paddock Road, to California Avenue, to Reading Road, to Dale Road, to Carthage Avenue, to Montgomery Avenue, to Smith Road, to Robertson Avenue, to Brownway Avenue, to Madison Road, to B. & O. crossing. Returning via the same route.

Number of buses—Nine

Schedules—Non-rush hours, every twenty minutes; rush hours, every ten minutes.

Fare—Ten cents.

Route G (Price Hill-Westwood).—From Eighth Street and Nebraska Avenue, along Nebraska Avenue to Rapid Run Pike, to Overlook Avenue, to Bridgetown Pike, to Boudinot Avenue, to Bridgetown Pike, to Glenmore Avenue, to Harrison Avenue. Returning via the same route.

Number of buses—One.

Schedules—Every 30 minutes.

Fare—Ten cents, but without transfer privilege.

Route H (Fairmount-Cumminsville).—From the Hopple Street viaduct and Beekman Street, on Beekman Street, to Powers Street, to Colerain Avenue, to Knowlton's Corner. Returning via the same route.

Number of buses—One.

Schedules—Every twenty minutes.

Fare—Ten cents.

Electric Shop Truck Earns \$6,000 a Year

For Cutting the Cost of Handling Heavy Material a High-Lift Electric Truck Operates Through the Milwaukee Shop on a Definite Schedule

BY HAROLD J. PAYNE

Staff of the Society for Electrical Development, Inc.,
New York City

WITH skilled labor high and unskilled workers expensive and also difficult to obtain, the Milwaukee Electric Railway & Light Company was faced with a definite need for conserving man power. Two years ago a high-lift electric truck was purchased for doing general handling work about the Cold Spring shops. Since that time the machine has been earning the wages of six men by taking the place of hand trucks and wheelbarrows which were previously used for moving parts and materials. Additional use for the truck has been found continually, so that it has been kept busy loading material into supply cars for transportation to other stations or towing trailers, tool wagons, etc., moving snowplows and like equipment for storage during summer months, hoisting stoves into cars, where these were used for heating; putting car compressors

SCHEDULE CARD FOR NINE TRIPS OF THE ELECTRIC TRUCK

Department	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9
Machine gallery.....	8:20	8:24	9:06	10:30	11:12	12:35	1:12	2:36	3:18
No. 1 storeroom.....	8:18	8:28	9:10	10:34	11:16	12:39	1:16	2:40	3:22
Armature room.....	8:15	8:30	9:12	10:36	11:18	12:41	1:18	2:42	3:24
Machine main.....	8:10	8:35	9:17	10:41	11:23	12:46	1:23	2:47	3:29
Forge shop.....	8:00	8:38	9:20	10:44	11:26	12:49	1:26	2:50	3:32
Steel shop.....	7:56	8:39	9:21	10:45	11:27	12:50	1:27	2:51	3:32
Brass foundry.....	7:55	8:40	9:22	10:46	11:28	12:51	1:28	2:52	3:34
Motor and truck.....	7:50	8:45	9:27	10:51	11:33	12:56	1:33	2:57	3:39
No. 2 storeroom.....	7:45	8:48	9:30	10:54	11:36	12:59	1:36	3:00	3:42
No. 6 storeroom.....	7:10		9:35		11:41		1:41		3:47
Buss department.....	7:15		9:38		11:44		1:44		3:50
Paint shop.....	7:20		9:40		11:46		1:46		3:52
Tin shop.....	7:30		9:45		11:51		1:51		3:57
Carpenter shop.....	7:35		9:50		11:56		1:56		4:02



Loading Material Directly to the Electric Truck as It Is Received in the Shop

into position and hauling barrels of oil and other heavy parts to specific locations where they are used.

The particular type of truck adopted is a model K-22 Yale, made by the Yale & Towne Manufacturing Company. It can raise and lower its load 26 in. This has proved of particular benefit, as much material requires loading and unloading at an elevation. Smaller parts and materials used in the maintenance and repair of equipment are nearly all stored in box containers or on platforms. These are arranged with supports so that the platform of the truck can be driven directly underneath and the material elevated and taken away without trouble. Four-wheel steering is provided in the equipment, which makes it very flexible and capable of working in close quarters.

Accompanying illustrations show two classes of work in which the truck is used. One illustrates the convenience of loading material directly from a large highway truck to the smaller shop truck. A barrel of gasoline has been placed in position and a box of other materials is being added. The second illustration shows the method of picking up and transporting scrap turnings from the machine shop.

In common with other types of industrial equipment, the electric truck requires reasonably intelligent use if



Picking Up a Box of Machine Shop Turnings Preparatory to Delivering It to the Scrap Storage

it is to yield a maximum return on the investment. At the Cold Spring shops a preliminary survey was made of the routes over which material was flowing. Information was also assembled as to the nature and quantity of the material. This survey showed that in the routine operations of the shop approximately the same volume of material had to be moved every day. Consequently it was decided to operate the truck on a schedule over a fixed route, covering fourteen divisions of the shop. The accompanying table gives the various departments that are visited by the truck and the time that stops were made at each department for nine trips. The driver punches a time clock at the start and finish of each trip. In an ordinary day he moves 100 loads of material, each of which may run up to 7,000 lb. in weight. The schedule time for a trip is about 50 minutes. When trips are completed in less than scheduled time the truck is available for odd jobs, such as stacking materials and placing equipment in cars.

In addition to eliminating the need for a gang of hand truckers the use of the electric truck has accomplished other objects. By having material ready for use ahead of time skilled workers are not kept idle waiting for supplies. Operations can also be scheduled and the schedules can be rigidly adhered to. This insures that the service requirements of all the divisions of the shops will be met. The elimination of congestion throughout the shops has followed handling of materials by the electric truck. The operator has a much less trying and fatiguing job to handle material in this manner and as a result it is handled more promptly. In the Milwaukee shop approximately 200 skid containers are used for this service. Their use has assisted materially in maintaining a perpetual inventory of stock and the keeping of this inventory has been simplified through their use.

In the two years that this truck has been in service repairs have been a negligible quantity. The truck has been overloaded frequently and its popularity has necessitated almost continuous service inside and outside the shop. Outside weather conditions such as snow and ice have not interfered with its operation.

One problem was encountered in connection with the transporting of material to the machine gallery, which is located on the second floor of the shop. The elevators serving this gallery were of insufficient capacity to carry the trucks when fully loaded. This difficulty, however, was overcome by carrying the trucks and loads separately, hand-lift trucks being used for moving the loads over short distances such as on and off the elevator.

Solid Colors for Denver Cars

THE Denver Tramway, Denver, Col., painted about 50 of its cars with an aluminum paint, a flat silver hue. They were very pretty, and as the sunbeams struck them as they rounded a curve they glistened with a real splendor, but they are so hard to keep clean the color is impracticable. This silver color was flat and unvarnished, but now a chrome yellow, part varnish, is being tried. As to which is the prettier, that all depends upon the individual. It is the plan of the company to omit stripes, to use a solid color and to spray on the paint. With about 370 cars to be painted every three years, it is estimated that the paint bill for this work will be reduced more than \$11,000 under the new method.

Rebuilding Pole Rack

New Concrete Bases Were Placed Under Old Poles Alongside Berlin Substation of the Connecticut Company at Small Cost

ADJACENT to the Berlin substation of the Connecticut Company a 40-ft. six-pole tandem rack is maintained to carry five three-phase circuits of 11,000 volts each and seven 600-volt direct-current feeders ranging in size from 300,000 to 500,000 circ.mil. The latter supply current for the local electric railway lines. Chestnut poles in the rack had been in place about eighteen years. As they had been set in swampy ground, consisting of moist red clay with an upper fill of cinders, the bases were badly deteriorated. Cross-arms and insulators, however, were in excellent condition, as were the poles themselves above the ground line. Possible alternatives were either to replace the poles with new ones, with the consequent expense of new upper structures and overtime rates to workmen changing over at hours when the high-tension circuits could be killed, or to reclaim the present poles and not disturb the upper structures or interrupt the service.

The second plan was considered the more satisfactory and it was decided to reclaim the present poles by cutting off their bottoms and mounting them on concrete bases. These consisted of V-shaped blocks into which four 1½-in. x 5-ft. anchor bolts had been cast, the entire concrete base with bolts weighing about 1,350 lb. On top of the base were mounted two malleable iron castings. The pole was securely clamped between the castings by means of six "U" bolts, three on each side.

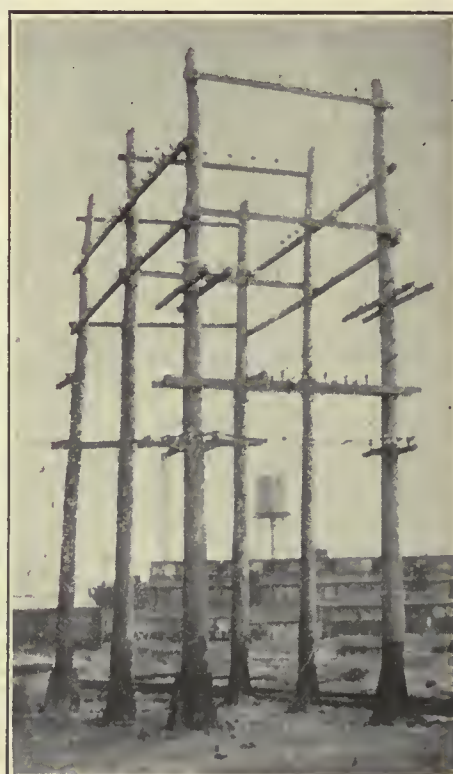
Three of the poles in the rack were bolted together as one unit with an 8-in. x 10-in. x 25-ft. timber. Jacks were placed under this timber and sufficient pressure applied to remove all perpendicular strain on all poles in the unit. The timber was then securely shored up



At Left, Decayed Butts of Old Poles Being Removed. At Right, Concrete Base Installed Under Old Poles

to hold it in this position. The decayed butts of the poles were cut off 6 in. above the ground line, the butts removed and the hole enlarged sufficiently to take the concrete bases. These were lowered into the holes, using the cut-off poles in the unit for support. The bases were then leveled and the earth filled in and tamped around them. The malleable iron castings were bolted to the concrete bases and the poles moved into place between them and fastened with the "U" bolts. All metal parts had been previously painted with red lead and were finally coated with black asphaltum. The process of remounting the rack was carried out under the supervision of Harry Hill, line foreman of the New Britain division of the Connecticut Company.

It is estimated by the company that \$335 was saved by reclaiming the rack rather than replacing the poles and installing new arms and insulators. As a sound piece of timber above ground has a period of life three times greater than a similar piece of timber in the ground, it is thought that the reclaimed poles will last 25 years longer.



At Left, Shoring Up Poles After Old Butts Had Been Cut Off. In Center, Lowering New Concrete Base Into Position. At Right, Malleable Iron Castings Were Used to Hold Poles in Place

The Readers' Forum

The Renewal Parts Question

THE CAPITAL TRACTION COMPANY

WASHINGTON, D. C., Jan. 2, 1926.

To the Editor:

The writer has been much interested in the articles in *ELECTRIC RAILWAY JOURNAL* recently on the cost of renewal parts for electric railways. An investigation of this subject shows that there are fewer operating companies manufacturing renewal parts today than there were two or three years ago. The reason for this must be either that they are able to purchase these articles cheaper or that they are able to purchase better articles than they can manufacture in their own shops.

The question of the cost of renewal parts manufactured by an operating company depends on what is charged as part of the cost; by that I mean what overhead charge is included in the cost. I have heard this subject discussed many times, but very few agree on what should be included as a proper charge. The overhead cost is there and is paid for somewhere, whether it is included in the cost or not. It must be reckoned with in determining the cost of renewal parts manufactured in operating shops as compared with costs of similar articles purchased outside. If no charge, or an incorrect charge, is made for overhead expenses a true cost is not obtained and the comparison is not correct.

It has been stated that a well-organized shop can manufacture repair parts to some extent at a profit because the same men and tools used for repair work can be used to manufacture repair parts when work is slack. My answer to that would be that it is not a well-organized shop, for there should be no slack time. There might be times when the force employed might not be able to keep the work up due to unusual conditions, but the number of employees should not be so large that it is necessary to bring in outside work to keep them busy. The regular force can be better employed on maintenance work than on the manufacture of repair parts.

A question which in my opinion is of more importance than the cost is, can you make the renewal parts as good as the manufacturers who make them in large quantities? The large manufacturer has facilities for determining the quality of his raw material that is a most important factor. He is able to buy this material on specification. His men become experts as they are constantly working on the same kind of work and do not have to shift from one class of work to another. The facilities for inspecting the work are better because there is more of it to do and it pays to assign inspectors to see that it is produced accurately. Therefore the loss from rejections is less.

The life, then, of the material should be longer. After all, that is what we are after. The cost of an article should be based on how long it will last and give good results, not on what the initial cost may be. Material purchased from a responsible manufacturer carries his guarantee. If the material does not give satisfactory service, he is ready to replace it or make an adjustment that protects the operating company from loss. On the

other hand, if similar material manufactured by the operating company is not satisfactory, there is no adjustment and the loss must be taken care of by the company itself. When repair parts are manufactured by the operating company their performance should be compared with the performance of similar material purchased outside before deciding which is cheaper. No matter how cheap an article may be, if it causes delays in service due to failure it becomes an expensive article.

The extent to which the operating companies will enter into renewal parts manufacture depends on what the manufacturer has to offer them in delivery, price and quality. The question of delivery is important, for if the operator can depend on getting good material delivered in a reasonable time he is not compelled to carry such a large stock on hand and is thereby enabled to reduce the amount carried in his stock account.

The amount of material carried in the storeroom of an electric railway is large and represents a large amount of money which is not revenue producing. It is therefore necessary to keep the amount on hand as small as possible. Close co-operation between the purchasing department and the engineering department will materially assist in procuring better material and also tend to reduce the amount of material carried in stock. The question of importance after all is, can you manufacture cheaper than you can buy? Before deciding this question, a careful study should be made to determine the cost and performance of the material in question.

H. E. Jordan in his article in the *JOURNAL* of Oct. 10, 1925, said: "This question deserves greater consideration by railway companies." That, in my opinion, is the answer to the argument, for if the question is given sufficient consideration it will be found that, when quality is considered, it is cheaper to buy than to manufacture.

R. H. DALGLEISH,
Chief Engineer.

Chicago Has Record Holiday Traffic

IF THE number of street car rides is any indication of the amount of Christmas shopping, Chicago merchants must have had the biggest business in their history this year, according to Chicago Surface Lines officials. All previous records for peak loads were left far behind and the company used more than 99 per cent of its equipment in an effort to meet demands. On some days all but seven of the 3,539 cars owned, or 99.8 per cent, have been on the streets.

The highest record in riding was made on Saturday, Dec. 19, when there were 4,962,313 riders, the greatest number ever carried in one day. November showed an increase of more than 6,000,000 rides as compared with November, 1924. There was a steady increase in riding every month since June, but the shopping season brought tremendous peak loads. There were more rides on Oct. 31 than ever before in one day, but that record was broken three days later.

The rerouting of street cars and prohibition of left-hand turns of automobiles in the Loop last year, the elimination of parking on the Loop sections of Van Buren, Wabash, Lake and Franklin Streets and other traffic reforms have proved of great benefit in handling the crowds, G. A. Richardson, vice-president of the Surface Lines, said. Without these improvements, he declared, street congestion would have choked every important traffic lane.

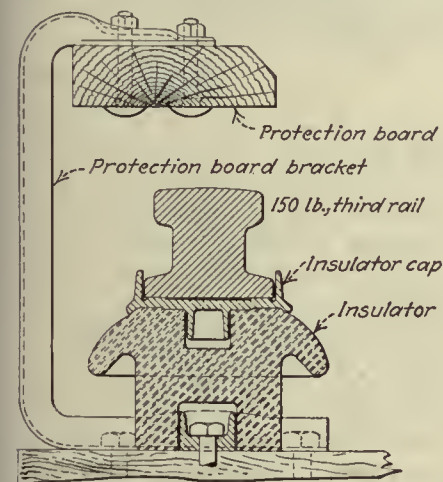
Equipment Maintenance Notes

Third Rail Insulator Maintenance

By G. H. MCKELWAY

Engineer of Distribution Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y.

ON ALL of the more recently equipped lines of the New York Rapid Transit Corporation the third rail is of 150-lb. section and is supported on porcelain third rail insulators resting directly on the ties. These insulators are prevented from moving horizontally by means of cup



Method of Supporting 150-Lb. Third Rail

castings lagged to the ties and projecting up into holes in the bases of the insulators.

The rail rests directly on a pronged cap with a projection on its bottom which fits into a similar hole in the top of the insulator, so as to keep the cap in place. At one time considerable trouble occurred due to the porcelain insulators splitting. Investigation showed that the splitting was caused by the rusting of the boss on the bottom of the cap.

Accumulation of rust on this lug increased its size so that not only was it impossible to separate the cap from the insulator, but the wedging force of the rust first caused hair-line cracks in the porcelain and eventually split it into pieces.

Owing to the fear that a serious accident would occur due to the breaking of large pieces of porcelain off of the insulators when they were installed on the elevated lines, and their resultant falling into the street

and striking people passing by, it was decided to examine all insulators of that type which were installed on the elevated structures. During this examination each insulator was removed and the cap taken off. In many cases the lug on the cap had swelled so much from the rust that it was impossible to pry it out of the porcelain, and the latter was broken in the attempt.

Not only were many of the bosses on the caps found to be so badly rusted that it was not safe to put them back but, on close inspection, many of the porcelain insulators

which seemed at first sight to be uninjured were found, after careful wiping off, to have developed hair-line cracks. These insulators were discarded.

When installing new insulators and caps as well as when replacing those which were uninjured, the boss and hole were given a thorough application of a heavy graphite grease. This, it is believed, will decrease rusting of the lugs. This careful inspection of the insulators has been made not only on the elevated lines but in damp portions of the subways as well.

From Log to Finished Car Parts

The Woodworking Machinery in the Shops of the Havana Electric Railway, Light & Power Company Provides for Taking Native Wood as Delivered in Logs and Making the Finished Parts for Car Body Repairs

By OTTO GOTTSCHALK

Engineer of Railway Equipment Department, Havana Electric Railway, Light & Power Company, Havana, Cuba

FOR maintenance repairs to car bodies and also for new construction, the Havana Electric Railway, Light & Power Company, Havana, Cuba, has found it economical to use native Cuban hard wood with the exception of pine which is imported from the United States in board lengths. The native wood is delivered to the railway in logs, some of which are as much as 40 ft. long and 50 in. in diameter. The railway company's equipment thus contains ma-

chinery required to rip these logs into slabs and timber framing of various dimensions as well as that necessary for finishing the various parts required.

In order to provide for carrying out this work in an economical manner, a modern fireproof building has been constructed for the large band-saw which is used to rip the logs. Formerly this equipment was located in an old wood-frame building and the machinery was driven by belts



New Woodworking Department of the Havana Electric Railway, Light & Power Company Has Increased Production 33 per Cent

through a long and complicated system of power transmissions. A single motor was used for the operation. It was desirable to decrease the fire hazard and also to increase the output without a great expenditure of money, so a modern fireproof building was constructed for the smaller woodworking machinery and a separate corrugated iron building was constructed for preparing the rough timbers. This latter building is located conveniently to the log storage and has a standard gage track running through it. The bandsaw is located at one end of this building and a large pit with foundation for the saw has been constructed of concrete. This provides a firm base for the machines and eliminates vibration, which is objectionable. The bandsaw is driven by a 50-hp. motor through a 12-in. belt. The motor is

hoist enables the workman to select any special log section that is desired without excessive handling. As a result of the improved equipment four men supply all labor for attending the saw where previously eight were required. The output has also been increased about 30 per cent.

The slabs and different special sections as they come from the bandsaw are taken to the building containing small woodworking machines. Each part is marked so that it can be cut into the particular shape desired, such as end sills, side sills, front sills, window posts, bulkheads and end posts.

The machinery in the woodworking department is arranged so that each section will pass from one machine to the next with a minimum amount of movement. Particular attention has also been given to the



Logs Are Sawed Into Convenient Sections in This Building Previous to Delivery to the Woodworking Section

located in the pit under the loading platform in the building, so that no space is lost on the floor. A compartment has been constructed in the pit, into which sawdust falls, and an exhauster driven by a belt from the saw flywheel shaft deposits the dust into barrels outside the building.

Logs are brought into the building on flat cars and are rolled off to the concrete ramp, which has the same elevation as the floor of the flat car. On the ramp the logs are cut by hand into the desired lengths and are then rolled down to the saw carriage, clamped in position and fed to the saw. As the slabs are cut they drop to another platform, where they are loaded on flat cars and are hauled to the woodworking machines in the other building.

The building which houses the bandsaw has several features which result in labor saving. The ramp construction of the platform permits logs to be rolled easily to the carriage for sawing; a cable with an overhead trolley and differential

locating of machines so as to give ample space for handling large sections without difficulty. In general, each machine has an individual motor either direct connected or driven by a belt. In some cases, where two machines require a motor of the same horsepower and it appears that both machines will not be used at the same time, one motor has been used to drive both machines. In this case the machines are located so that the same belt lengths can be used.

A large motor-driven exhauster has been installed as a part of the equipment for the woodworking department. Each machine is served by a tube and there are also numerous tubes provided for floor sweep-ups. All sawdust and shavings are automatically deposited in a specially constructed car outside the building. The relocating of the machines and the installation of the new exhausters have increased the capacity of the woodworking department about 33 per cent with no additional labor.

Providing Sockets or Sleeves for Cables

DIFFICULTY experienced in getting permanent connection with soldered terminals or sockets which are used with stranded wire has led the Bridgeport Brass Company to make a survey of practices of various railways in connection with its Phono Hi-Strength wire. Information developed in this manner, together with data obtained in a socketing test of samples, has led the manufacturer to recommend the following:

Sockets.—The sockets should be of the open-end or sleeve type, as it is impossible properly to fan and clean the strands if the closed-end type is used. The open end also makes it easier to determine if the soldering is done properly. For cables $\frac{1}{2}$ in. in actual diameter and under the sleeves should have a conical chamber at least $3\frac{1}{4}$ in. deep with a taper of about $\frac{1}{4}$ in. per inch. For cables from $\frac{1}{2}$ to $\frac{3}{4}$ in. actual diameter a conical chamber at least 4 in. deep with the same taper as given above is desirable. Sockets may be malleable iron, steel or bronze, but where corrosion is an important factor it is of course better to use bronze fittings.

Preparation of Cable.—The end of the cable should be carefully bound with light brass or copper wire pushed through the socket. It should then be bound again at a point which, when pulled back into the socket, will leave the ends of the cable extending approximately $\frac{1}{2}$ in. above the top of the opening. The end binding should then be removed and the wires fanned out. The wires should then be cleaned by hand with emery cloth, or, better, by dipping in a 50 per cent water solution of nitric acid. If the nitric acid dip is used care must be taken not to dip the cable quite up to the binding or else the acid may feed into the cable due to capillary action. The cable must be thoroughly washed after the nitric acid dip and then dipped in a zinc chloride soldering flux. After the flux has thoroughly dried the wires should be tinned by dipping them in the molten socketing mixture. Any moisture on the wires when dipped in the metal will cause it to boil and blow. It is best for the operator to wear goggles and gloves in the operation.

Flux.—Zinc chloride flux can be made by adding more zinc than can be dissolved to hydrochloric acid or what is commercially known as muriatic acid. It is well to keep a

Dick Prescott Works Overtime

And Learns Something About Cars



FOR several days following his talks with the shop foremen regarding the work of the new engineering department, Dick Prescott, engineer of equipment of the Consolidated Railway & Light Company, was busy putting some of his plans into action. He saw so many opportunities of taking detail off the hands of various foremen and at the same time laying out definite standards and practices to replace the old rule-of-thumb methods that he was impatient to get to work as quickly as possible. This filled so full the days immediately following that he and Steve White, the carpenter shop foreman, had little time to get together and consequently they spent several evenings in the new engineering office making the study of car repair practice that they had both agreed to do the day following their return from their inspection trip.

Steve had managed to make up an inventory of the several different major items of equipment in service on the property. The figures summed up as follows:

City passenger cars.....	320
Different types included....	11
Types of trucks.....	9
Types of motors.....	10
Wheel sizes.....	3

"Gee, that's some mess," said Dick when they had summarized the figures in this form.

"I'll say it is," agreed Steve.

"How do those cars run in weight?" asked Dick, starting on a fresh sheet of paper.

"Well, I didn't get a chance to get each type on a scale, but I've got the

figures on some of them," said Steve, consulting the worn notebook in front of him. "The old battleships—that's the group of 40 cars in the 200 series—go about 48,000 lb. The twenty bowling alleys run around 46,000 and the six rebuilds—those are the ones we rebuilt after the fire—weigh about 49,500. Then the maximum tractions scale 44,000 and the big turtlebacks average 45,500."

Steve paused a moment to check back the figures in his book.

"Oh, yes," he continued, "here's the center-entrance cars. They're on two different trucks. Twelve of them weigh 42,000 lb. each and the other nine are 43,500. Then I've got the new cars. There's fifteen of them and they average 32,000 lb."

"How does the seating capacity on the new cars compare with the battleships?" asked Dick.

"Four seats less."

"How old are the big fellows?"

"Let's see, I think about 22 years."

"What do you suppose is the relative maintenance cost on those two groups?"

"Gosh, that's the whole trouble. We don't have the figures in shape so they tell the story. If we did we wouldn't be spending money right now to patch them up."

"Well, that's our job now; to get some way of estimating what the costs are on each group of equipment," said Dick.

"All right," replied Steve, "let's see what we can do." He laid down his notebook and pulled a pad of paper in front of him.

small piece of zinc in the solution to be sure that there is no appreciable amount of free acid. Any other non-corrosive flux recommended for use with tin-lead solders may be used provided it is found that a satisfactory union between the solder and the wire is obtained.

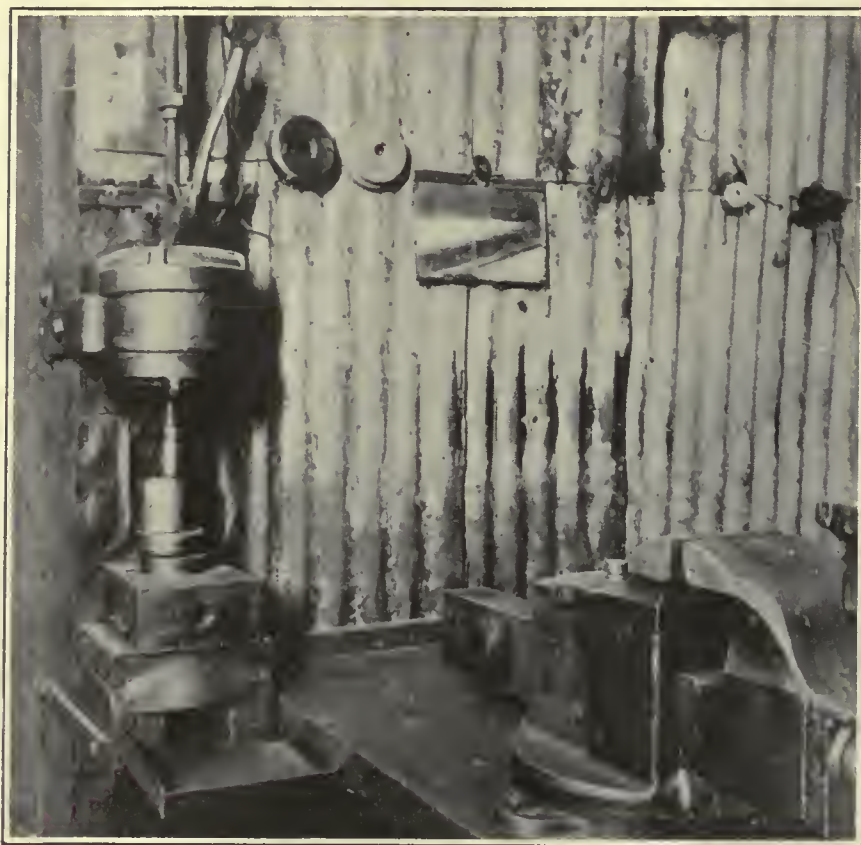
Socketing Mixture.—The mixture used for pouring into the socket and also for tinning the wires should be made up of two parts of tin and one part lead. This mixture melts at about 360 deg. F. and can be poured easily at temperatures from 370 to 390 deg. F. The temperature of the metal should not be over 410 deg. F. when the wires are dipped for tinning or when it is poured into the socket. If it is used at a higher temperature there will always be danger of annealing the wire.

Making the Socket.—After the wires have been tinned and prepared the cable should be drawn back into the socket so that the ends project slightly above the end of the conical opening. Care must be taken to have the cable leave the socket straight and in line with the axis of the socket, otherwise the stresses will not be uniformly distributed on the wires. It is also important not to have any of the fanned wires in contact with the sides of the socket, otherwise the solder will not surround the wire completely and poor holding power will result. All parts of the cable and socket which will come in contact with the molten metal when it is poured into the socket should be thoroughly dried, but it is sometimes desirable to wrap a wet piece of waste or cloth around the small end of the socket to chill the solder more quickly. The socketing mixture should be poured into the socket slowly and at as low a temperature as can be used and still obtain a good sound casting. It is usually well to hold the socket in a vise and neither the cable nor the socket should be moved until the solder has thoroughly set. After this the socket may be quenched in water to cool it rapidly.

Trolley Wheel Bushing Press*

FOR forcing bushings in and out of trolley wheels a pneumatically operated press has been designed and constructed in the shops of the

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.



Shop-Constructed Trolley Wheel Bushing Press

Denver Tramway, Denver, Col. The construction consists of a piece of 6-in. pipe with two pipe caps and a piston and plunger. The whole device is mounted on the wall near the workmen's bench. An anvil necessary for convenience of the workmen is located underneath and a three-way air valve is provided for control of the press.

Car Cleaning Methods in Boston

CLEANING more than 2,000 cars for the year 1924 cost the Boston Elevated Railway slightly more than \$477,000. The entire outside surface of each car in service, including the glass, is cleaned daily with a soft mop. Vestibule glass is cleaned on both sides and the inside of all windows is gone over with a damp chamois or cloth to remove streaks and spots.

After every storm all surface cars are washed thoroughly with clean water as the car surface becomes streaked from dirt washed from the roof. Outdoor storage is used quite extensively in Boston. This renders more difficult the problem of keeping cars clean in winter since little or no water can be used. Daily, generally at night, the floor of the car is swept clean, a solution of water and dis-

infectant being used to lay the dust and sterilize the interior. After the car is swept and the dust has settled, it is thoroughly dusted and the lamps, hand straps, window sills, and register glass are wiped with a dry towel.

At intervals of from one to two months, according to the condition of the car, both inside and out are given a thorough cleaning by using in addition to water some cleansing compound that will effectively remove all stains without injuring the paint or scratching the glass.

Car cleaning in Boston would be much simplified if all cars could be treated alike, but as the service on different lines is quite different cleaning requirements are quite varied. Cars running through paved city sections present a different problem from those running where the streets are macadamized. Also cars stored under cover require much less work than those stored in the open. The problem of keeping cars clean in rainy weather is different from that in fair weather, and cars which run in subways or tunnels are harder to keep clean than those which do not. Underground, the dry dust with its fine particles of iron which come from

brakeshoes is kept in motion continually by the rapid movement of trains. An accumulation of this dust on the cars in a wet condition becomes iron oxide or rust, which is one of the most difficult things to remove from glass and painted surfaces.

Overcoming Trolley Breaks Due to Severe Temperature*

CONDITIONS in El Paso, Tex., are such as to render the maintenance of trolley wire on the lines of the El Paso Electric Railway a serious problem. Extremely hot days followed by cold nights cause an expansion and contraction that is excessive and decidedly harmful to the wire. To overcome troubles from trolley wire breaks, the company has installed Phono-Electric wire over special work in the downtown sections. This is inspected on a regular maintenance schedule and since its installation a very marked improvement has resulted in the number of trolley breaks. The following figures show the results obtained. During 1921, 239 breaks; 1922, 193 breaks; 1923, 102 breaks; 1924, 33 breaks; 1925, 15 breaks for first six months of operation.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

New Equipment Available

Heavy-Duty Quick-Set Detachable Wrench Set

DESIGNED to fill an urgent need of electric railway shops for a heavy-duty wrench set, the Blackhawk Manufacturing Company, Milwaukee, Wis., has just placed such a set on the market. In order to determine the suitability of this set for electric railway work, one was placed with the Milwaukee Electric



Extra-Heavy-Duty, Quick-Detachable Wrench Set

Railway & Light Company for a test of one year. This set has been used daily putting in motor studs with a 15-ft. extension bar on the ratchet wrench. Force has been exerted by the weight and pull of two men. This set has given satisfactory service and no replacements have been found necessary during the trial. An accompanying illustration shows the new heavy-duty set with quick detachable wrenches.

Atomizing Type Oil Burner

DESIGNED to give maximum combustion and great heat quickly, an atomizing type of oil burner and preheater has been brought out by the Alexander Milburn Company, Baltimore, Md. The cheapest grade of crude fuel, kerosene oil or distillate and compressed air under pressure varying from 50 to 100 lb. is used. In addition to furnishing a direct supply to the burner, the compressed air also maintains pressure in the oil storage tanks. This creates a greater velocity in the oil feed line and insures a positive and uniform flow.



New Atomizing Type of Oil Burner and Preheater

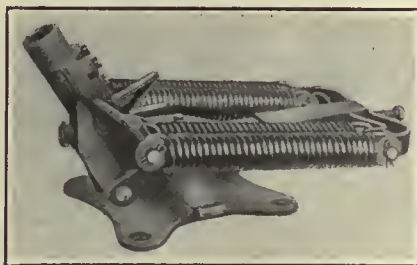
The flow of both air and oil is through straight-line orifices unhindered by coils or staggered passages. The oil under pressure enters the atomizing chamber at right angles to it and in an annular form. The compressed air flows directly through the center, striking the filament of oil and atomizing it. There is no siphoning effect of either oil or air. Immediately upon opening the valves, the gas at the burner can be ignited and work can be started.

This burner is particularly convenient for use in preheating castings for welding in electric railway shops. Preheating is now considered quite essential for large castings in order to neutralize expansion and

contraction strains and to effect economy of gas. Without preheating, complicated castings are liable to develop new breaks at points remote from the weld when they are again placed in service.

Tapered Roller Bearing Trolley Base

FOLLOWING nearly four years trial on a selected number of railway properties a trolley base incorporating the tapered roller bearing



Tapered Roller Bearing Insures Great Durability and Sensitiveness

features is now being offered to the market by the R. D. Nuttall Company, Pittsburgh, Pa. This is now designated as U. S. No. 20-A and is standard equipment with the company. The main forward step taken in the design of this base is the use in the swivel of roller bearings with hardened raceways and a suitable means of adjustment.

A trolley base must withstand a heavy cocking load due to the weight of the pole, harp and wheel and to the wire pressure. These pole loads cause the swivel to tip to an extent depending on bearing clearances and wear. The result is that in bases employing a center pin, rollers and outer raceway the rollers bear at their upper ends on the side of the trolley base opposite the pole and at their lower ends on the pole side. Between these two points the rollers must be slightly cocked and crosswise of the raceway, each roller being in a slightly different position, depending on its location around the swivel.

With the new construction this localized end pressure is distributed over the entire surface of the tapered roller by the use of two tapered roller bearings located one at the top and one at the bottom, since the pressure at the top and the bottom of the swivel is practically perpendicular to the rollers. The cocking tendency is still present, but the perpendicular pressure just mentioned is produced and the tendency to twist is minimized by closer tolerances

which are possible with these adjustable bearings.

More even distribution of pressure over the area of the roller results in less pressure per unit of area than is obtained with the longer rollers now commonly employed, either loose or assembled in a cage. A further advantage is that the base actually hangs on the roller bearings, as compared with the usual arrangement in which a large amount of the weight is supported on the center pin with consequent friction and loss of freedom to the swivel.

Arm Feeds Metal Cutting Saw Into Work

BY USING a horizontal arm instead of a vertical one on a bandsaw, a cutting head is produced which, by its own weight, feeds the saw into the work instead of the usual method of feeding the work into the saw. This is a feature of the new metal cutting bandsaw produced by the Metal Saw & Machine Company, Inc., Springfield, Mass.

The weight of the horizontal cutting head is counterbalanced by a powerful spring which gives an automatically variable feed pressure to take care of differences in hardness in the piece of metal being sawed. This construction saves the bandsaw blade and gives a straight cut regardless of variations in the stock. With the positive feed of the vertical type of bandsaw commonly used, the stock is forced into the saw and results in crooked cutting, stripped teeth and broken blades. With the new construction, constant attention



Horizontal Napier Bandsaw for Metal Cutting

by the operator is unnecessary after the material is secured firmly.

The new machine is driven by a Westinghouse motor, which is regulated to give a particularly high speed. This is possible since the blade travels in the cutting direction only and the pressure adjustment gives a smooth, even movement.

American Association News

Metropolitan Section Devotes January Meeting to Bearings

Design, Lubrication and Maintenance of Electric Railway, Motor and Car Building Received Active Consideration at the Jan. 8 Meeting Held in New York

MOST of the secrets about the bearings of electric motors and car journals were aired at the meeting of the Metropolitan Section of the American Electric Railway Association held in New York on the evening of Jan. 8. Before one of the largest attendances in the brief life of the Metropolitan Section, the manufacturers told of the practices and the solutions of problems that have helped to develop the modern railway motors. A carefully prepared paper by M. Guynes, of the railway motor engineering department of the General Electric Company, is abstracted elsewhere in this issue. It is filled with the technique and the detail adhered to in the manufacturing process and is full of pertinent information and practical suggestions that visualize to the maintenance engineer the importance of good lubrication and good maintenance of bearings, to avoid their rapid wear. One workman called a bearing a heat generator. This is true, and the efforts of the manufacturer and the maintenance engineer must be devoted to make it a poor generator. A number of lantern slides helped to visualize the important points.

Mr. Guynes' paper was followed by an excellent presentation of the same subject by J. F. Dean, of the engineering department of the Westinghouse Electric & Manufacturing Company. This paper was also filled with information of interest and many practical suggestions. It is also abstracted elsewhere in this issue.

The January meeting was called to order at 8 o'clock by President J. W. Hulme, having been preceded by a Dutch-treat dinner at Keene's English Chop House. On account of the length of the meeting only the treasurer's report was given, indicating that there was \$1,337 on hand and that the membership committee had increased the number to 1,122 members, an increase of 47 in the past month.

A telegram from C. E. Morgan, who was in Cleveland attending the exhibit committee meeting, sent the best wishes of the committee, including J. W. Welsh, Morris Buck, F. C. J. Dell.

Following the presentation of the two papers on the design and maintenance of bearings, Joseph F. Lamb, staff engineer of the Texas Company, discussed the papers, saying that the experience of the Texas Company has shown that the best car oils were manufactured from high grade steam cylinder stock, made up in seasonal grades

to compensate for the great differences in temperature. Mr. Lamb does not agree that it is best for motor bearings to receive free oil when worn. While this method may be satisfactory under ideal mechanical conditions, the facts are that the oils used and the oiling system used must operate satisfactorily under other than ideal conditions. The down feed type of oiling frequently results in flooding the armatures, thus doing great harm.

Emphasis was laid on the statements of the two manufacturers' representatives that a long fiber all wool waste has the characteristics most desirable in capillarity and resiliency. There are in use grades of waste containing mixtures of graphite, talc and mica which have proved to be disadvantageous because these fillers slip out and cause restriction and plugging of the opening between the oil and waste chambers in motors and prevent the bearings from receiving the proper supply of oil.

The Texas Company has achieved excellent results in the use of electrically heated, thermostatically controlled waste saturating tanks. With these tanks the waste saturation time is accomplished in four hours as against 120 hours in unheated tanks or tanks with uncontrolled heat.

While all of the ideas brought out have been good, Mr. Lamb stated that the best ideas find their value only in proper application and therefore his company is pleased to note the tendency among railway mechanical department officials to select more intelligent labor, take care of lubricating duties, and when this improvement becomes general, the results will justify the judgment of those responsible.

Alfred A. Green, of the Galena Signal Oil Company, outlined in an interesting manner the progress in the art of lubrication. Lubrication was first gained by old-fashioned grease cups. About 1900 the use of oil became recognized as a better practice. Also about that time the practice of putting long covers on the axles was started. The straight bronze bearings then gave way to the babbitt lined bearings and somewhat later the use of waste wick type of lubrication came into operation. Mr. Green laid great stress on the success that his company has had with lubrication on the mileage basis, the theory being that the right amount of lubrication is applied to bearings and the waste and pro-

miscuous use of oil is avoided. Too much oil, he avers, does the bearing no good, and is apt to cause difficulties in other parts of the equipment.

The axle collar gave trouble, and the fiber collar came into use, giving some measure of success. Now the axle bearings are covered and lubricated with much greater success.

A film of oil in the bearing surface is all that can be used. Why use a barrel to supply the film, when a pint will do as well or better? To this point the manufacturers of bearings and oils held the center of the stage. D. D. Owenn, general foreman New York Rapid Transit, then told of some of the problems of the operator. Shortage of cars and consequent necessity of keeping the cars almost continuously in service, in his mind, practically prevent the use of many of the refinements possible in the manufacturing processes. Limited shop conditions do not allow the same grade of machine or workmanship possible in the original manufacture.

Mr. Owenn's road now has running 22 cars and 88 bearings, all journal brasses, using a cotton waste with a series of small springs placed in and behind the waste in order to hold it against the revolving axles. Mr. Owenn stated that it was impracticable to pack bearings properly in a truck while under a car, and that except in emergency cases, the waste is allowed to stay in the journal until periods of general overhauling, when the truck can be removed from the car and the motor bearings properly repacked with new waste. He reported little trouble from loose axle cap bolts. Occasionally one bolt will be broken, but the three other bolts hold the cap in place and the broken bolt is repaired upon inspection.

The practice recently adopted by the Metropolitan Section of passing blank cards around on which questions may be asked brought forth several interesting questions. One question asked in regard to the success of roller bearings brought forth the answer from Mr. Guynes that roller bearings had been used successfully in motor bearings. They could not be well applied to axle bearings and he said he could volunteer but little information in regard to the use of roller bearings in car journals, except that the Pennsylvania Railroad was now testing a number of roller bearings on some of its steam road equipment.

L. M. Clark, vice-president of the Railway Improvement Company, then gave a short discussion of the papers. He emphasized the use of good practices and the use of good oil in the lubrication of bearings, but stated that the responsibility for purchasing good oil did not end there, that it was necessary to have the oil 100 per cent clean when it reaches the bearing. One can hardly realize more difficult conditions

for lubrication than under an electric car, which is subjected to the filth and dirt of city streets, the temperature changes and the water and snow often encountered. Another point to take into consideration is the fact that fresh oil should replace old oil that has done its duty. The mere fact that a space is filled with fluid does not necessarily mean that this is good oil. Railway motor bearings, as you know, are so designed that oil may pass out at both ends. This is not a total loss, as it is a protection to the flange end of the bearings against wear, and the open end against water; where oil comes out, it is rather difficult for water to get in.

Mr. Clark further stated that it is far easier to insure perfect contact of the waste with shafts or axles if the waste is located at the top of the bearing much more so than if it is carried in the side or below. When the oil is carried above the bearing, gravity is added to capillarity in supplying oil to the bearings.

With the top feed arrangement, the oil that is held in the waste naturally settles to the bottom, which is in direct contact with the shaft or axle. This is not the case with the side feed or underfeed type. The oil settles in the waste after the motor has been stopped and is at the greatest distance from the bearing at the time when the oil is needed and needed quickly, when the motor or car is first started after a long layover.

Engineers well advised in motor lubrication have questioned the advisability of applying oil at the top of the bearing, which, as you know, is the high pressure side. Experience, however, has demonstrated that no difficulties have been encountered on account of the waste opening being on the top. In fact, the opposite results predominate on account of the direct application of the oil to the shaft.

In summing up the situation, the motors and car journals should be put in first class mechanical condition. Old frames should be thoroughly annealed so as to normalize the internal stresses that have accrued through millions of vibratory shocks. This is best done after any necessary welding has been completed. Armature and axle bearing openings should be accurately rebored to the proper sizes and all precautions taken to see that these bearings are afterward accurately held in place. For good operation motors should be run as the manufacturers designed and built them. Limit bearing wear as closely as you can. The spreading of gear and pinion centers causes noisy operation and is detrimental to their life. The oil companies recommend good oil; use it and keep it clean.

Interspersed among some of these papers and following, a number of entertainment features were given by employees of the Interborough Rapid Transit Company. Prof. J. Hauger performed a number of tricks with a series of rings and later did some clever card tricks. Now you see it and then you don't. A banjo and song entertainment was given by Messrs. Sutherland and Readyoff.

Two other entertainment numbers were later given, one a dance by F. Heide and R. Haggerty, with H. Gilday

at the piano, and then several songs by the well known tenor, E. Wager, were given, with H. Gilday at the piano.

The informal dinner before the meeting was attended by 89 members and

the meeting following by 230. The next meeting will be held Feb. 5 and will be a series of motion picture films depicting the manufacturing processes of steel.

Bearing Life and Lubrication of Electric Railway Equipment*

BY JOHN S. DEAN

Engineering Department, Westinghouse Electric & Manufacturing Company

QUITE frequently practical railway men in various parts of the country have asked this question: "Why is it that the armature bearings furnished by either the General Electric Company or the Westinghouse company have so much longer life and give better service than any other bearings we have ever used on our motors?" This may not be the experience of all operators. There is, however, enough evidence available to show that this is quite generally true. It may be satisfactorily explained by saying that the bearings are de-

signed to have ample capacity and great care is given to all details. The materials used are of the best quality obtainable, the bearing shells are properly babbitted, the workmanship is of a high grade, backed by many years of experience and training. When the bearings are mounted they have a good tight fit in the housing and are accurately aligned. They are also constructed with minimum allowable radial and end clearances and are of the correct size.

DESIGN OF ARMATURE BEARINGS

Modern railway motors are fitted with bronze bearing shells lined with $\frac{1}{8}$ in. thickness of tin base babbitt metal and are liberally designed to carry their load and resist the pounding and vibration to which they are subjected in service. A minimum size window with well-rounded edges and corners is provided through which oil is fed to the journal by means of a waste wick, the lower part of which rests in an oil chamber.

The bearing shell is made from a good grade of dense bronze, the composition of which is approximately 80 per cent copper, 10 per cent antimony and 10 per cent tin. The Brinell hardness of this alloy is around 70. The babbitt metal is made from a tin base alloy made from virgin metals and is similar in composition to the original Isaac Babbitt formula, which is 88.9 per cent tin, 7.4 per cent antimony and 3.7 per cent copper. The babbitting of bearing shells must be accomplished with great care. The shells must be carefully cleaned and then tinned. The use of an acid flux speeds up this work. The bearing shell must then be preheated before being assembled in the babbitting machine. The hot babbitt should be continuously stirred before pouring to keep the metals properly mixed. Use of babbitting pots with automatic temperature control insures a correct pouring temperature, which should range between 460 deg. and 480 deg. C.

All finished bearings that do not give a clear, bell-like tone when suspended and struck with a small hammer should be rebabbitted, as a dull, dead-like sound indicates that there are air pockets between the babbitt lining and the bearing shell, which are sure to cause trouble in operation. Good workmanship in the machining operation, press fitting, alignment and assembly are absolutely necessary. The clearances allowed in babbitt-lined bearings are those standards adopted by the American Electric Railway Engineering Association.

*Paper delivered at meeting of the Metropolitan Section, American Electric Railway Association, Jan. 8, New York City.

COMING MEETINGS

OF

Electric Railway and Allied Associations

Jan. 20-21—Central Electric Traffic Association, Miami Hotel, Dayton, Ohio.

Jan. 22-23—Central Electric Railway Accountants' Association, Miami Hotel, Dayton, Ohio.

Jan. 26-29—Society of Automotive Engineers, Annual Meeting, Detroit, Mich.

Jan. 27—New York Electric Railway Association, Hotel Commodore, New York, N. Y.

Jan. 28-29—Central Electric Railway Association, Lincoln Hotel, Indianapolis, Ind.

Feb. 5—Metropolitan Section, American Electric Railway Association, Engineering Societies Building, 29 West 39th Street, New York, N. Y., 8 p.m.

Feb. 11—Central Electric Railway Master Mechanics' Association, Portage Hotel, Akron, Ohio.

Feb. 18—American Society Civil Engineers, American Society Mechanical Engineers, American Institute Electrical Engineers, and American Institute Mining and Metallurgical Engineers, joint meeting, United Engineering Societies Building, 29 West 39th Street, New York, N. Y., 8:15 p.m. Subject: "The Effect of the Diesel Electric Engine on Heavy Electrification."

Feb. 24-26—Electric Railway Association of Equipment Men, Southern Properties, Mobile, Ala.

April 13-16—Southwestern Public Service Association, Galveston, Tex.

In the Westinghouse plant the journals on new armature shafts are ground to exact size on a Norton grinding machine. This is not practical in repair shops, as the shaft would have to be removed from the armature. Armature shafts should not be allowed to run in service if worn tapered more than 0.005 in. If the wear is greater than this the shaft should be trued up to a maximum size or reduced in definite steps of $\frac{1}{32}$ in. on the diameter, so as to use standard under-size bearings.

When journals have reached their scrapping limit it is the practice of some operators to restore them by the use of sleeves made from Shelby steel tubing, while others build them up by welding. Our experience indicates that shafts made from heat-treated or special alloy steels should not be welded.

ARMATURE AND AXLE BEARING LIFE

Answers to a questionnaire sent out by the American Electric Railway Engineering Association several years showed that the minimum armature bearing life reported was 15,000 miles and the maximum armature bearing life was 200,000 miles, while the average of all reports indicated 80,000 miles. Reports have been obtained elsewhere of as high as 375,000 miles, which is probably the upper limit that has been obtained. It is probably reasonable to assume that the average life of armature bearings should be between 80,000 and 90,000 miles.

From the same questionnaire it was determined that axle bearings had a minimum life of 2,000 miles and a maximum life of 150,000 miles, averaging 55,000 miles. The average life can thus be generally assumed to be between 50,000 and 55,000 miles for axle bearings.

MAINTENANCE AND INSPECTION OF RAILWAY MOTOR BEARINGS

A careful inspection was made on a street railway recently and the data obtained were segregated into the maintenance records in two different carhouses. This inspection covered 88 motors over a period of thirteen months. The inspection and maintenance methods, including lubrication practices, at carhouse A were far superior to those in carhouse B, as was indicated by the results. Carhouse A reported 0.002 in. wear per 5,000 miles, whereas carhouse B reported 0.0095 in. wear per 5,000 car-miles. The bearing wear at carhouse B was thus some 62 per cent greater than at carhouse A and showed conclusively that too much stress cannot be laid upon the importance of regular and systematic inspection of equipment.

Oil, being the medium of lubrication, is of utmost importance. It is recommended that railway operators be guided by the suppliers of oil. Do business with a reliable and a dependable company. Guaranteed mileage contracts should be avoided, as they sometimes work out to be economically wrong. Temperature affects the oiling of motors and therefore the proper grade for summer and winter use should be used. A definite system and schedule of oil changes should be adopted and followed religiously. If the oil is too heavy, rapid wear of the

bearings results, although they may not get overheated.

A suitable and convenient storage room should be provided and equipped with modern appliances for the handling and storing of all oil stock and lubricating material. Long strand wool waste, the strands varying from $\frac{1}{8}$ in. to $\frac{1}{4}$ in., should be used. Experience shows that such wool yarn when properly saturated will not glaze and will feed plenty of oil to the bearings. Further, it retains its springiness, which keeps the waste wick against the journal when once properly packed. The difference in price between low grade waste and a high grade of wool waste is about 15 cents per pound, and as the average bearing takes only a pound of dry waste to 4 lb. of oil the difference is practically 15 cents a bearing, whether a good grade of waste or a poor one is used. A bad bearing may cause maintenance difficulties in excess of \$75 if the armature must be rewound. Experience of the Westinghouse company has found that the most satisfactory way of packing a motor bearing is to make up a wick of long wool yarn, which is placed in the oil chamber, so that it will extend from the bottom to the top of the housing. This wick should be made the maximum size that can readily be put in place to insure a good oil feed. After the wick is in place, fill the remaining part of the housing with bunches of waste packed in behind the wick, using great care to spread the wick at the bearing window. In making up the wick and in packing the bearing extreme care should be taken to use only clean and well-saturated waste. Ordinarily bearings should be repacked at least twice a year. The most suitable time for doing this work is when changing the grade of oil, due to change in seasonal temperature.

Definite oiling schedules should be adopted at periods equaling about every 1,000 miles of service. Maintain the oil at proper levels, determined by means of a gage, after receiving the advice of the manufacturers of the motors. Tests show that under similar conditions the flow of oil for a 1½-in. lift is approximately five times more than at a 3-in. lift. The maximum possible lift for wool waste and car oil is 5 in. and the maximum lift for practical oil supply is 3 in.

Car journal bearings also should be carefully packed and lubricated. When the car is overhauled and the bearing is to be repacked the housing or journal box should be thoroughly cleaned out. A wick of waste is packed at the rear end of the box to lubricate the rear journal fillet and to keep out dust and water. Pack the box with a continuous bunch of waste, forcing it in place so that it makes a good contact with the underside of the journal. Care should be taken to see that all waste should be kept below the center line of the journal. See that no strands of waste are left hanging outside of the box after the cover is closed, as they will tend to drain the oil from the journal box. When properly saturated waste is used in packing the journal box; no free oil should be added.

Men responsible for the oiling of equipment should be trained. Simple

typed instructions on packing and bearing oiling should be placed in the hands of oilers. These instructions should be supplemented by short talks to the men in charge of this work, explaining the fundamental principles of bearing lubrication, the advantages of good lubricating methods and the troubles that result from poor methods.

CAPILLARY-VACUUM OILERS

The Railway Improvement Company has recently put on the market an oiler which works on the capillary-vacuum principle. It has been applied to a large number of older type of railway motor bearings, which originally used grease lubrication. Reports indicate that this device has greatly improved the operation of these bearings. It is claimed for this oiler that bearing costs can be reduced 50 per cent by eliminating the dirt, grit and other foreign substances which are constantly finding their way into the bearing housing, clog the packing waste and help to grind out the bearings.

In discussing the question of oiling and lubrication, similar care should be given to all other parts of the equipment.

Regular and systematic lubrication of the above details will not only result in a smooth running car but will produce a longer life, less vibration and noise and a consequent reduction of general maintenance expense.

Federal Bill Limiting Exemption Now Given on Interest from Municipal Bonds

IN THE discussion on the present federal income tax bill before the finance committee of the United States Senate, a plea was recently presented by Philip H. Gadsden of Philadelphia for an amendment to Section 213 of the revenue act of June 2, 1924. This is the section relating to the exemption given under the law to interest received on bonds of a state and its political subdivisions. The arguments were presented in behalf of the American Electric Railway Association, the American Gas Association, and the National Electric Light Association. Mr. Gadsden proposed that the present exemption of the interest on these bonds should not apply to obligations issued since Jan. 1, 1925, "in payment for or to be used in paying for the construction, acquisition, operation or maintenance of any utility, which bonds, warrants or obligations do not constitute general indebtedness of issuer, but are payable out of the revenues of such utility or otherwise than by general taxation, and from the rents, dividends, securities or transaction of any business carried on for gain or profit and income derived from any source whatever."

According to the speaker, Congress has the constitutional power to make a distinction between the governmental activities of a state or city and its business activities when it enters the fields of public utility and ownership. This position was justified by Mr. Gadsden in a series of quotations from decisions of the courts of last resort of a number of states and by the Federal Supreme Court.

The argument was made that unless this change is made in the federal income tax law, at least two classes of the community suffer serious disadvantage. One is the rural dweller, whose utility service is nearly always supplied by a private company, since practically no municipally owned electric plants extend their service lines into the country. Through his payment of rates he assists in the support of the federal government, while the user of service from a municipally owned plant is free of this burden. The other discrimination comes between the dwellers in cities served by a private utility and in those where the utility is owned and operated by the municipality. In the latter case, the car rider is relieved from contributing some part of his car fare to the federal government, while the patrons of electric railways where the utility is privately owned must pay a rate of fare which includes their proportionate share of the federal tax. The point is made that in these days of friendly but keen competition between cities in the same territory for industries, such a different street railway fare or gas or electric rate might confer a distinct advantage on the city

which owns its own utility. Consequently it constitutes a discrimination on the part of the federal government against all the other cities which do not.

The conclusions of the argument are summarized by Mr. Gadsden as follows:

1. The ownership and operation of public utilities by a municipality or other governmental agency are not governmental functions.

2. When a municipality or other governmental agency engages in the ownership and operation of public utilities, it does so in its proprietary capacity and cannot claim the exemption from taxation applicable to the discharge of governmental functions.

3. The proposed amendment would not apply to bonds issued by municipalities or other governmental agencies in their capacity as such, and the tax sought would not and could not be a burden upon any governmental function of such political subdivision.

4. The tax by the terms of the amendment is confined strictly to the interest on such bonds as on their face appear to have been issued for the construction, acquisition, operation or maintenance of a public utility, which do not constitute general indebtedness of the issuer but are payable out of the revenues of such utility or otherwise than by general taxation.

5. Every consideration of public policy on the part of the federal government supports the contention that municipalities or other political subdivisions entering into the field of business should be subject to the same conditions and limitations as those imposed by the federal government upon like classes of business.

it is necessary to make the shaft larger than the strength requirement would demand.

The length of the bearing must be determined by the allowable pressure per square inch and the space available for lubricating the bearing. On some locomotive motors the pressures are as high as 500 lb. per square inch when starting a train and 185 lb. per square inch at the continuous rating of the motor, but on motors for single-unit or multiple-unit cars the pressures can be kept lower, some being as low as 200 lb. per square inch at starting and 20 lb. per square inch at the free running speed.

The waste chamber in the frame head or axle cap must be of sufficient size to hold a good sized wick extending from the top of the opening through the bearing to below the minimum oil depth. The thickness of this wick need not be more than $2\frac{1}{2}$ in. at its maximum, but at the minimum the thickness should not be less than about $\frac{3}{4}$ in. for large motors where a great amount of oil is required for lubrication or about $\frac{1}{2}$ in. on small motors. The entrance to the waste chamber should be accessible and of sufficient size to allow proper packing, also it should be covered to keep out water and dirt.

The oil chamber should hold sufficient oil to keep the oil depth within the desired limits from one oiling until the next and still have a settling chamber below the minimum oil depth.

Design, Lubrication and Maintenance of Railway Motor Bearings*

BY M. GUYNES

Railway Motor Engineering Department, General Electric Company

NO DOUBT every one would like to have a railway motor designed without bearings, and this has been approached in the bipolar gearless locomotive motor. This motor does not have any bearings of its own, the locomotive journals being used to keep the armature in its place. Owing to the speed of a one to one ratio between the armature and the wheel and to the necessity of using only two poles the bipolar gearless motor is too heavy and too expensive for any except high-speed passenger locomotives. A less expensive motor can be made by using a speed reduction between the armature and the wheels. So at present the multipolar, geared railway motor is almost universally used for operating single and multiple unit cars.

However, the geared motor must have bearings, because the motor must be held to the axle to keep the gearing in line, and the armature must be retained in its place with respect to the poles and brush-holders. Various types of construction have been employed, but the most satisfactory are incorporated in the modern box frame motor, with its overhung axle brackets, its clamped axle linings, its solid frame heads driven and bolted in place and its keyed armature linings pressed into the frame heads.

In order to have low friction in the bearings the shaft or axle must be held away from the bearing lining by a lubricant film. Oil was used in the first railway motors and is still the best lubricant. In the early days the oil

cup for feeding the oil to the bearing was tried. Today all over the world there are a great many motors with grease lubrication and the combination of grease and oil lubricated bearings is still running. In Australia and elsewhere there are a number of motors running with oil rings in the armature bearings. Grease lubricated ball bearings and roller bearings have been tried and are operating now, but apparently the most satisfactory all-around bearing for a railway motor is the oil-lubricated, waste-packed sleeve bearing, which with good care will run 250,000 miles in the ordinary city service before removal is necessary.

Because of the relatively low pressures and speeds, unlined bronze axle bearings have proved the most satisfactory for small railway motors, although for large motors a tin-coated bore is desirable. But for armature bearings, where the pressures and speeds are fairly high, a bronze shell with a lining of tin base babbitt has justified the expense, because when first put in service, if there is any misalignment or if there are any high spots, the babbitt will flow and increase the actual bearing surface at a sufficiently low temperature to prevent serious damage.

As the shaft and axle diameters are usually fixed by the strength required, the application of a motor to a given service must be checked to make sure the surface speed of the shaft is not too high. Furthermore, shaft deflection must be checked on heavy multiple-unit cars or locomotives to make sure that the bending of the shaft at the operating speed is not sufficient to break down the oil film, and sometimes

it is necessary to make the shaft larger than the strength requirement would demand.

The centers in the ends of the shaft should be properly located in the rough bar so that straightening of the rough bar is not required. Because of warping it is desirable to rough cut all keyways before finish grinding of the keyways. The journal surfaces should be ground to dimensions shown in the accompanying table. To produce smooth journal surfaces they should be rolled between smooth-hardened steel rollers. After being rolled the journal surfaces should be protected by sleeves until the armature is assembled in the frame. During the stacking of the armature core the punchings must be assembled correctly or the shaft will be bent when the core is pressed.

After the cores are assembled, but before the windings are put on, the shaft should be checked for straightness. If the shaft runs out of true more than 0.00025 in. per inch of length of the journals and not over 0.00075 in. per inch it should be straightened to run within the limit of 0.00025 in. per inch. If, however, it is out of true more than 0.00075 in. per inch the shaft should not be used.

Armature bearing shells should be inspected just after the roughing cut operations are finished and those scrapped which are found to have shrink cracks or spongy spots. The bores of the shells should be tinned all over. The bearings should be brought to a temperature of at least 150 deg. C. when the babbitt is poured and the babbitting should be done in such a way that the layer of babbitt is compact and free from blow holes. A fair-

*Abstract of a paper presented at a meeting of the Metropolitan Section, American Electric Railway Association, New York City, Jan. 8, 1926.

sized radius should be provided where the bore joins the flange to allow the oil to flow around and out to all of the flange. After the bearings are finish bored and faced they should be mounted on arbors and the outside finish ground to the dimensions shown in the table. The edges of the waste opening should be trimmed to allow easy access of the oil to the journal.

The fits on the frame heads, for the frame, should be turned to within limits shown in the table and the frame heads should be finish bored true with respect to the fit for the frame. The finish of the bore should be very smooth to give a good fit of the bearings and the dimensions and the pressure required to assemble the bearings should be as shown in the table. After the bearings are assembled they should be broached to give a smooth bore of the correct diameter.

The tongue fit on the axle caps and the groove fit in the magnet frame should be machined to the dimensions shown in the table. When machining magnet frames for large motors it is desirable to rough machine the frame head fits and axle bores before finishing either, but this is not necessary on the small motors which do not warp so much. In order to obtain good alignment it seems best to finish the frame head fits with the axle joint face bolted to a fixture on the boring mill and then finish the axle bore on another machine tool, locating from the finished frame head fits. The fits for the frame heads and the axle bore should be within the dimensions shown in the table.

Experience has shown that it is good practice to put a heavy oil on the shaft journals near the thrust collars and on the thrust collars just before assembly of the armature in the frame.

After being finish machined the axle bearing shells should be carefully inspected for shrink cracks and spongy spots. If any of these faults are found the shells should be scrapped. The finished axle bearings should be checked in a pot fixture representing the magnet frame and axle cap to make sure the dimensions are such that they will operate satisfactorily. The outside diameter and the bore should be machined to the dimensions shown in the table. The edges at the split should be relieved and sharp corners removed from the waste opening to allow the oil to flow where it is needed. Where the bore joins the flange a large radius or chamfer with rounded edges is desirable to allow the oil to flow onto all of the face of the flange.

An axle dust collar, to protect the flange of the commutator end axle bearing, and a tight fitting dust guard between axle caps will give much longer life of axle bearings.

LUBRICATION

Before being put in service the motor bearings should be lubricated. In an oil lubricated bearing the shaft or axle is separated from its bearing by a film of oil and it appears that low friction is the result of one side of the oil film adhering to the shaft or axle, the other side adhering to the bearing lining and the sliding occurring within the film of oil. Experiments have shown that the friction in the film of oil depends on the

ALLOWANCES AND LIMITS FOR RAILWAY MOTORS

Part and Place	Allowance	Limits
<i>Shaft</i>		
Journals.....	None	+0.000 in. -0.001 in.
<i>Armature Lining</i>		
Outside diameter of body.....	+0.002 in.	+0.0005 in. +0.0005 in.
Bore up to 3½ in. diameter.....	+0.009 in.	+0.002 in. -0.002 in.
Bore 3½ in. diameter and above.....	+0.013 in.	+0.002 in. -0.002 in.
Assembly pressure....		3 to 7 tons
<i>Frame heads</i>		
Fit for frame.....	None	+0.002 in. -0.000 in.
Bore.....	None	+0.000 in. -0.001 in.
<i>Axle caps</i>		
Tongue fit.....	None	+0.001 in. -0.000 in.
<i>Magnet frame</i>		
Groove fit.....	None	+0.000 in. -0.001 in.
Bore for frame heads...	None	+0.002 in. -0.002 in.
Bore for axle linings...	*	+0.004 in. -0.000 in.
<i>Axle linings</i>		
Outside diameter.....	+0.003 in.	+0.001 in. -0.001 in.
Bore.....	+0.030 in.	+0.002 in. -0.002 in.

* Before boring the axle preparation, 0.014-in. thick shims should be put between axle caps and axle joint face of the frame so that a clamp fit on the axle bearings will be obtained when the boring is finished and the 0.014-in. shims are removed.

kind of oil used with a particular bearing material, the shaft or axle being of steel.

The oil used should adhere well to the shaft, axle and bearing and be of sufficiently high viscosity to maintain the required thickness of oil film under the operating conditions of bearing pressure and temperature. It should also be thin enough, at the temperature of the bearing housing, to allow capillary action to reach the journal.

The main requisite of the waste is that it should be of a springy nature so that it will not settle down or away from the journal and will allow the foreign matter, which is collected from the journal, to work back and down through it without glazing the surface. Also, the waste should be of such a nature that the oil will feed fast enough to allow of a relatively large variation in oil depths and still supply the amount of oil required to keep the bearing cool. Experience has proved that the long fiber all wool waste has characteristics most nearly approaching those desired.

In order to make sure that the process of lubricating the bearing will start immediately after being packed, it is necessary to saturate the waste with the oil before packing. As the oil flows so slowly at winter temperature it is desirable to provide some means of keeping the treating tank up to summer temperature and thus make a uniform minimum time for treating the waste. At summer temperature about 72 hours is required for soaking and 48 hours for draining. When properly saturated, a little oil will still flow out if a ball of the waste is squeezed.

No matter how good the oil and waste are, if the packing of the housing is not properly done hot bearings will occur. The waste must be placed so that it acts as a wick extending from below the lowest oil depth to above the top of the opening to the journal and of sufficient thickness to provide the

quantity of oil required. Because of the shape of the waste pocket in the frame heads at the bearing flange end special care is necessary to provide a wick the full width of the opening to the journal. The tightness of the packing is important, for, if too loose, the waste will settle and not cover all of the opening to the journal. If a pad of the saturated waste is placed on top of the packing and next to the cover, it will catch and hold most of the dirt which falls in when the cover is opened. The covers to the oil wells and waste chambers should be kept tightly closed when the motor is in service because the water and dirt, which would otherwise enter, are the worst enemies of a railway motor bearing.

The location of the bottom of the opening to the journal with respect to the bottom of the oil well should be obtained from the manufacturer so that the desired oil depths can be determined. The desirable oil depths are from ½ in. below the waste opening to 3 in. below for ordinary city service or about 2 in. below for services where the shaft speed is high for a considerable time between stops.

Flooding of motors with oil results in serious damage to insulation of windings and commutators and is also the cause of much brush trouble.

On self-ventilated motors the openings to the drip pockets in the frame heads become air inlets if left open and much longer life of armature bearings will be obtained if these openings are loosely plugged with dry waste, which should be replaced with a fresh piece of waste at each oiling.

MAINTENANCE

On some of the modern small wheel cars the space allowed in the truck assembly is far too small to give the attention to the armature bearings which they must have in order to give satisfaction.

Hot bearings are serious, for they are not only likely to damage themselves, the shaft, axle and sometimes the armature, but may cause warpage, which can be corrected only by remachining of the parts. However, if the car were given a bearing run, as is necessary on an automobile before being put in regular service, the bearings would have a chance to give real satisfaction.

The records of one operating company show that 70 per cent of its armature troubles are due to mechanical failures, and bearings play the most important part. Worn and loose bearings are largely responsible for short life of gears and pinions, breakage of shafts, peening of bearing housings, flashing, broken armature leads and loose armature parts; in fact, they have more to do with high maintenance costs than any other part of the motor.

The inspections of bearings and bearing housings for worn bearings, loosely fitting covers and water and sediment in oil wells should be made at sufficiently short intervals to reduce the bearing troubles to a minimum. Radial wear of armature bearings can be found by checking the air gap. On single and operated equipment, where the wear is upward on some bearings, special care must be taken, as a great error may creep in. Radial

wear of axle bearings can, of course, be found by noting the clearance at the bottom between the axle and the bearing. Wear on the bearing flanges can be determined for the armature bearings by moving the armature longitudinally and for the axle bearings by moving the motor along the axle, but on single-end-operated equipments having helical gearing most of the wear will be toward one end.

Fifteen hundred miles of service between inspections for both armature and axle bearings is about right for large motors and about 1,000 miles for small motors. It should be borne in mind that worn armature bearings are more serious than worn axle bearings. The radial wear on the armature bearings should not exceed $\frac{1}{16}$ in. on large motors or $\frac{1}{32}$ in. on small motors, while that for axle bearings should be not greater than $\frac{1}{16}$ in. on large motors or $\frac{1}{32}$ in. on small motors. The flange wear on armature bearings should be held to a maximum of $\frac{1}{8}$ in. on large motors or $\frac{1}{16}$ in. on small motors, and for the axle bearings $\frac{1}{8}$ in. on large motors and $\frac{1}{16}$ in. on small motors. If the wear allowed is less than that determined by the above limits, longer life of the other parts may be expected.

The one thing which causes as much wear on axle bearings as anything is loose axle cap bolts, and since this fault must be overcome the manufacturers should be glad to know of such troubles so that with united effort improvements will be obtained.

Satisfactory results should be obtained if the armature and axle bearings are oiled every 1,500 miles on large motors and 1,000 miles on small motors, but these periods must depend on the rate at which the oil is used.

One large operating company does not add oil to the axle bearings but depends on saturated waste, which is replaced at about 10,000-mile intervals, furnishing the necessary oil. While this practice is probably satisfactory where followed, it is doubtful if the average trolley company would be willing to use such a large amount of waste as would be required on the small motors.

Easier oiling will result from having the oil at summer temperature and oiling while the motors are warm. When necessary to open the cover of the oil well or waste chamber, less dirt will fall in if the dirt on the outside is removed from around the opening and in the winter care should be taken to prevent snow and water entering while the chambers are open. After measuring the oil depth the necessary amount of oil should be added, to bring the level up to the maximum desired depth, by pouring into the oil well and not the waste chamber.

The practice of stirring the waste to prevent glazing does not seem to be very satisfactory, but the replacing of all of the waste after cleaning at about 10,000-mile intervals has given good results. When cleaning, attention should be given to removing all of the sediment and as much care should be taken during repacking as was taken at the first packing.

The practice of changing armature bearings each time an armature is changed should not prove satisfactory

as it quickly results in the bearings becoming loose in the frame heads, and it is far better to have excessive clearance in the bore than to have the bearings loose in the frame heads. However, it should be borne in mind that serious damage may be done by endeavoring to operate a motor with small bearing clearance at the one end and excessive clearance at the other end.

When making a general overhaul of a motor all parts should, as far as possible, be brought back to the original finishes, fits and clearances by using as good material as was used in the original parts, and attention should be called to the fact that bent axles and shafts and tapered journals may cause trouble.

It is sometimes necessary to weld certain places on frames, axle caps, etc., and the manufacturers have found that it is almost impossible to do much welding at one place without having to weld all of the finished surfaces, because the heating to the welding point at one place usually causes a sufficient warpage to throw other parts out of alignment.

Low costs of operation should be the object of all, and manufacturers of railway motors should be glad to assist in solving any problems, for by so doing they would be better fitted to produce satisfactory apparatus. Satisfactory equipment means lower maintenance costs and hence an improved financial position for the company as a whole.

Bus Operation

SUBJECTS to be studied during the year were discussed and selected at a meeting of the committee on bus operation of the Transportation & Traffic Association held at association headquarters, New York, Jan. 4. Altogether some twenty subjects were suggested for consideration but four were later eliminated, leaving sixteen, for the study, of which sub-committees were appointed.

The committee indorsed the uniform classification of bus accounts as recommended by the Accountants' Association, urged its adoption by member companies, and advocated that efforts be made to have it adopted by the various state commissions. Sub-committees were appointed as follows:

Interurban Rates—R. N. Graham, D. A. Scanlon and E. D. Dreyfus.
City Rates—A. T. Warner, C. B. Cooke, Jr., and C. H. Chapman.

Taxation—S. W. Greenland, C. B. Cooke, Jr., E. D. Dreyfus and A. Hughes, Jr.
Rights of Steam and Electric Railways in Operation of Buses—C. B. Cooke, Jr., A. Shapiro, V. W. Berry and A. Hughes, Jr.
Franchises—S. W. Greenland, D. L. Fennel and R. B. Hill.

Chartered Service—C. B. Cooke, Jr., D. A. Scanlon, A. Hughes, Jr., and A. Shapiro.
Equipment (from the transportation standpoint only)—R. N. Graham, B. W. Arnold and V. W. Berry.

Carrying Packages and Mail—V. W. Berry, C. B. Cooke, Jr., A. Shapiro and R. B. Hill.

Opportunity of the Bus in Developing Public Relations—C. H. Chapman, J. B. Stewart, Jr., and E. D. Dreyfus.

Customer Ownership—R. H. Smith, E. D. Dreyfus and S. W. Greenland.

Rates During Development Periods—A. T. Warner, C. H. Chapman, S. W. Greenland, C. B. Cooke, Jr., and A. Hughes, Jr.

De Luxe Service—D. L. Fennel, A. Shapiro, E. D. Dreyfus and A. T. Warner.

Development Expense—C. B. Cooke, Jr., A. T. Warner, A. Hughes, Jr., and E. D. Dreyfus.

Tire Mileage Contracts—J. B. Stewart, Jr., S. W. Greenland and C. B. Cooke, Jr.
Liability Insurance—R. N. Graham, A. Hughes, Jr., V. W. Berry and J. B. Stewart, Jr.

Double-deck Operation—D. L. Fennel, S. W. Greenland, D. A. Scanlon and A. Hughes, Jr.

A telegram was received from B. W. Arnold saying that he had been called back to Milwaukee while en route to New York City on account of the death of his son. A telegram of sympathy was sent by the committee to Mr. and Mrs. Arnold.

Members present at the meeting were J. B. Stewart, Jr., chairman; S. W. Greenland, D. A. Scanlon, R. N. Graham, E. D. Dreyfus, A. Shapiro, A. T. Warner, C. D. Smith, C. B. Cooke, Jr., V. W. Berry, C. H. Chapman and A. Hughes, Jr.

Merchandising Transportation

ON JAN. 12 the merchandising transportation committee of the Transportation & Traffic Association held its first meeting this season at association headquarters. Chairman R. N. Graham, general manager of the Pennsylvania - Ohio Electric Lines, Youngstown, Ohio, presided. Other members present were S. E. Emmons, Baltimore; E. A. Palmer, East Pittsburgh; C. D. Smith, New Brighton, Pa.; E. A. Burleson, Schenectady, N. Y., representing J. C. Thirlwall; A. C. Spurr, Wheeling, W. Va.; J. A. Dewhurst, New York; O. A. Broten, Chicago; J. B. Donley representing W. H. Boyce, sponsor, Pittsburgh; E. M. Walker, Schenectady, sponsor; J. W. Welsh, executive secretary, and Guy C. Hecker, special engineer of association headquarters also were present.

After discussion of the accomplishments of similar committees in other years and the advancement of the art of merchandising transportation it was decided to break up the writing of the report into eight sections, each to be prepared by a sub-committee. The tentative divisions of the subject and assignments made by the chairman at the meeting are as follows:

Courtesy, Salesmanship and Appearance of Trainers—C. D. Smith, R. W. Emerson and J. B. Donley.

Advertising by Circular Letter, Car Cards, Newspapers, Billboards and All Other Forms—A. C. Spurr, O. A. Broten and W. W. Holden.

Equipment—The show window of the railway company, concentrating particular attention on details of lighting, heating, seats, painting, cleaning of cars—J. A. Dewhurst, W. E. Wood, S. E. Emmons, E. A. Palmer and J. C. Thirlwall.

Special Types and Classes of Service and Special Rates of Fare—C. D. Smith, J. A. Dewhurst, S. E. Emmons, W. H. Burke and H. L. Brown.

Maximum Use of Facilities, Including Freight and Express Operation—S. E. Emmons, E. A. Palmer, O. A. Broten, A. C. Spurr, J. B. Donley and J. C. Thirlwall.

Merchandising Methods Necessary in Changing Methods of Operation, Such as Establishment of One-Man Service—O. A. Broten, E. A. Palmer and R. N. Graham.

General Company Interests in Civic Affairs—W. E. Wood, C. D. Smith, R. N. Graham and J. A. Dewhurst.

Co-operation and Training of Employees in Merchandising Problems—J. B. Donley, W. W. Holden, J. A. Dewhurst and R. N. Graham.

All sub-committees were asked to have drafts of their sections prepared and written in time for the next general meeting of the committee to be held some time in May.

Engineering Executive

ON JAN. 7 the executive committee of the Engineering Association held its second meeting for the season at headquarters, New York, with President R. C. Cram, chairman; C. R. Harte, R. H. Dalgleish, Daniel Durie, M. B. Rosevear and W. F. Graves in attendance.

Attention was called to approval by letter ballot of certain matters requiring action of the 1925 standards committee. These included a supplemental report on steel rails of the committee on way matters and a drawing in the report of sub-committee No. 6 of the power transmission and distribution committee relating to trolley contact devices.

President Cram reported on the action taken by the American executive committee approving the furthering of research by the Engineering Association. Mr. Cram spoke of this as being a forward step on the part of the parent organization in recognizing the work of the engineer.

Several research subjects under investigation by the Engineering Association were discussed. It was agreed that study of the committee on rail corrugation should be continued and carried to completion with the same personnel as previously. The committee on automatic substations was directed to proceed with its tests on ventilation, and the committee on noise reduction to continue its investigation. It was recommended that the latter committee investigate the possibility of obtaining co-operation from the technical schools. As to trolley wire specifications, Mr. Rosevear explained the significance of the twist test, which he said is not included in standard specifications for other current-carrying wires. It was brought out that line engineers consider this test of considerable value in determining the quality of trolley wire. It was planned to make a series of tests in actual service on wire of known qualities.

After some discussion, Mr. Hecker was directed to prepare a procedure for requesting expenditures from funds available to the various committees, for submission to the executive committee for approval by letter ballot.

The president announced that by letter ballot the executive committee approved the omission of abstracts of reports from the proceedings. A second letter ballot concerned the reduction of routine business on the floor of the convention. This brought out that nearly all of the time available at the annual conventions is devoted to the transaction of routine business, principally approval of committee reports and adoption of standards. The opinion was expressed that such approval could be obtained through letter ballot, freeing the convention for a program of original papers and discussion. It was decided to present the matter before the American executive committee at its next meeting.

A motion was adopted to form a committee on convention program for the purpose of selecting subjects and speakers on engineering subjects. Mr. Harte was appointed chairman, Messrs. Dalgleish, Durie and Miller given the assignment of preparing the

program for an equipment day; Messrs. Rosevear and Scofield for a power day, and Messrs. Graves and Cram for a way and structures day.

PUBLICATION OF ENGINEERING MANUAL

Preparations for the publication of the 1926 Engineering Manual were discussed. It was voted that no rebate should be made for the return of first edition copies. It was voted to issue paper bound sections as heretofore. As to the way and buildings and structures sections, it was decided to retain the present subdivisions.

Mr. Hecker pointed out that the present practice of permitting revisions of Manual sections every year was leading to considerable confusion on the part of users and was resulting in large annual supplements. It was decided that revision of Manual sections shall be permitted only in the years of republication with the exception of revisions considered of sufficient importance to demand immediate attention if approved by the executive committee, or specifications taken from other associations or prepared jointly by the Engineering Association and other associations, which may be revised for the purpose of keeping such specifications up to date and uniform.

Mr. Durie suggested that a reduction in the number of drawings would be possible through the use of letter dimensions with tables. This plan was referred to the Manual committee with instructions to report back to the executive committee.

ADDITIONAL SUBJECTS SUGGESTED

Several new committee subjects were considered. A letter ballot approved the inclusion of the subject of car lighting. It was voted to have this taken up by the equipment sub-committee on modern car design, increasing the personnel, if found desirable, by the inclusion of several manufacturer car lighting experts.

Letters from manufacturers of anti-friction bearings were read, suggesting that the subject of roller bearings be considered. It was the sense of the committee that the subject had not yet reached a point of development warranting investigation by the Engineering Association.

Two additional subjects were assigned to the equipment committee. These are No. 7, "Study the modernization of car equipment with special reference to appearance and comfort and convenience of passengers," and No. 8, "Study motor leads, connectors and supports to provide a miscellaneous method and practice on the subject. This is to include size and strand of all leads, connectors, covering for cables, methods of supporting and marking of terminals."

The committee approved a motion by Mr. Dalgleish, seconded by Mr. Harte, that the study of the subject of substitute ties be discontinued.

Mr. Hecker outlined the experiences and results to date with the new procedure being followed by the way and structures division. The executive committee was unanimous in approving the new method of organization and was of the opinion that the committee reor-

ganization be extended. It was suggested that First Vice-president Harte should start the tentative organization of a power group.

SIMPLIFIED PRACTICE

Mr. Dalgleish, chairman of the special committee co-operating with the Division of Simplified Practice of the Department of Commerce, gave the status of several subjects with which the association has had contact, as follows:

Simplification of sidewalk glass and roof lights: Recommendations of the division have been formally approved.

Recommendations for grinding wheels: These have been accepted and formally indorsed.

Recommendations for tacks and nails: The executive committee indorsed the sizes of tacks recommended for use in the upholstery department.

Simplification of shovels, spades and scoops: Formal indorsement of the association is being withheld pending approval by the way and structures committee.

Carbon commutator brushes: Simplification of sizes of carbon brushes has been started and a report is expected within a short while.

Mr. Hecker stated that at present no standard procedure has been set for presenting specifications to the A. E. S. C. It was the sense of the meeting that such procedure is necessary. The following was approved:

1. A specification intended for presentation to the A. E. S. C. shall, after preparation, be submitted to a standing committee or the standards committee of the association for criticism and approval.

2. The specification shall then be submitted to the executive committee for criticism and approval.

3. The specification, after approval by the standards committee and executive committee as above, shall then be presented to the A. E. S. C. as a tentative standard only. The status of "tentative" standard shall then be maintained for one year, after which it may be advanced in accordance with A. E. S. C. procedure to the grade of American Standard.

4. If the specification is turned down at any time by any of the bodies whose approval is required it must then be returned to the sectional committee for revision.

Mr. Dalgleish accepted appointment as the second representative of the association on the main committee.

Attention was called to the authorization of extension of the scope of the A. E. S. C. project on plain girder rails to include joint plates, omitted from the original report.

Specifications for tubular steel poles are now in process of preparation, including a simplified list of sizes as the result of a questionnaire circulated among approximately 100 companies using steel poles.

The representation of the association on the sectional committee on overhead line crossing specifications has been filled out and the committee is now about to function.

It was announced that H. S. Murphy has accepted appointment on the sectional committee on specifications for zinc coating on iron and steel.

A number of matters involving relations with other associations were considered. Principal among these were specifications being handled by the A. S. T. M. These included hard and medium-drawn copper wire, copper trolley wire, and carbon steel rails.

Representatives of the association on committees of the National Fire Protection Association were announced, as follows: L. D. Bale, power house committee; R. L. Weber, National electrical code.

Mr. Harte reviewed the standardization work of the American Institute of Electrical Engineers.

H. A. Johnson and E. J. McIlraith were appointed to represent the association at the American Road Builders' Association convention.

Manufacturers' Engineering Committee

TABULATING essential characteristics of new cars, analyzing financial reports of railways that have been operating new equipment and a study of reports on obsolete equipment kept the manufacturers' engineering committee busy Jan. 14 and 15 at association headquarters, New York City. The full committee was in attendance, consisting of G. C. Hecker, chairman; James A. Brooks, C. A. Bursleson and W. J. Clardy.

A large number of blueprints of late car designs had been supplied by various car manufacturers. These were studied carefully and the governing dimensions were tabulated. Analysis of the various characteristics of modern car design enabled the committee to select a number of designs that appeared to embrace most of the essentials. These will be analyzed and studied further to determine definite sizes and types most desirable for various classes of service.

Representatives of the electrical manufacturers have assembled considerable information from properties that have been operating new equipment. Study of this information is being made by the committee at the same time as other data regarding savings in operation and maintenance that have resulted from operation of new equipment are being assembled.

The survey to determine age of equipment now operated is nearly completed and particular attention will now be devoted to tabulations and analysis that will enable the committee to draw definite conclusions.

M. & O. Committee Makes Preparation for Visits

SECRETARY G. C. HECKER of the management and operation committee of the American Association has sent to all members of the committee supplies of blank field reports and of a pamphlet prepared by Labert St. Clair outlining the purpose of the state committees on public utility information.

He also called attention of the members to the meeting of the entire committee, which has been called for Jan. 27. Through the courtesy of L. M. Brown this meeting will be held

in Indianapolis at the Indianapolis Athletic Club. A Dutch-treat dinner will be served at 6:30 p.m.

A limited number of proofs of the forthcoming handbook of modern methods has been received by Mr. Hecker. He plans to distribute samples of these among the committee members so that they may become familiar with the contents and method of presentation adopted.

Atlantic City Being Considered for the Convention

CONSIDERATION of Atlantic City as the place for holding the October convention is being given by the committee on location. Arrangements were made for a sub-committee consisting of the same persons who visited Cleveland last week to inspect the proposed facilities at Atlantic City the evening of Jan. 15. Those making the inspection at Cleveland were Chairman C. E. Morgan, Executive Secretary J. W. Welsh, Director of Exhibits F. C. J. Dell, J. H. Alexander, Morris Buck, H. J. Kenfield, J. C. McQuiston, W. C. Parker, A. L. Price, A. M. Robinson and L. W. Shugg. In addition A. J.

Purinton and J. R. McFarland have signified their intention of being present. A difficulty encountered in case Atlantic City is chosen is that the available space for exhibition purposes is insufficient to provide proper facilities and keep the delegates together. Even the arrangement of last year, with a portion of the automotive exhibits in a separate space across the Boardwalk, is impossible of repetition, as the property is being built upon. A proposition has been advanced to build a permanent exhibit hall fronting on the Boardwalk.

At Cleveland it was found that the immense auditorium with two large floors available for exhibition purposes will give only 50,000 sq.ft. of net space, or less than half that needed to house the show. There is available a large plot of city property immediately adjoining the auditorium on which it is proposed to erect a temporary building which can have a floor area of 70,000 sq.ft. or more if needed and still provide plenty of space for outside working exhibits. Through the co-operation of President J. J. Stanley and Vice-President J. H. Alexander of the Cleveland Railway it would be possible to build this at a nominal cost.

News of Other Associations

New Limit Gage Standard

WORK of preparing standard gages, including the method of using the gages and tables showing the degree of accuracy required in the inspection of parts for different classes of work, has just been completed through the standardization of limit gages by the American Engineering Standards Committee. As an example of the advantages from this standardization, a wheel intended for a certain sized shaft made by one manufacturer should fit upon the same sized shaft made by another manufacturer. Under present conditions, however, perfect fitting is rarely realized. The reason is that the wheel manufacturer bores a hole in accordance with one set of gages, while the manufacturer of the shaft uses a set of gages based upon a different system. In consequence, one piece may be either a trifle too large or too small for the other, with the result that the wheel will either not go on the shaft at all or else it will fit too loosely. With the new gages most manufacturers will use the nationally standardized uniform gages for determining the dimensions. Perfect fitting should be assured no matter when and where the new parts are manufactured.

The report now presented provides a classification of the various kinds of fits from the loosest as used in agricultural machinery and similar equipment to the forced or shrink fit, where the parts are pressed together under great pressure, so as to be rigidly attached to each other and to stay there, as is required for car wheels.

In general, a certain fit between two mating parts will be obtained by checking the size of each part by means of

two gages, each representing one of the two limits between which the actual size of the parts must be kept. One gage is called the "go gage," the other the "no-go gage." If only such parts are accepted as are shown by these two gages to be correctly machined perfect fitting should be obtained.

The plan for standardized tolerances, allowances and gages has been developed through the co-operated effort of constituent national, technical, industrial and governmental bodies of the American Engineering Standards Committee. The committee itself has now placed its final approval upon it and has presented it as a national standard to American industry.

Gages of this type should save considerable time and expense on many occasions when equipment of different manufacturers are assembled in either manufacturing establishments or in car shops of operating companies.

Central Traffic Meeting

ON JAN. 20 and 21 the Central Electric Traffic Association will hold its next regular meeting at the Miami Hotel, Dayton, Ohio.

The morning session on Jan. 20 will begin at 9 o'clock, and will be in the nature of a round-table discussion. Committee work necessary during the session will be transacted during the afternoon of Jan. 20. In order that more time may be given to the transaction of business committee work will be completed as far as possible before the meeting.

The session on Jan. 21 will be devoted to reports of committees and such other business as may properly be presented.

The News of the Industry

Temporary Rate Increase in Oakland

Rates on the lines of the Key System Transit Company, Oakland, Cal., are to be increased as a result of the company's application for relief following a higher wage award made recently to carmen by an arbitration board. This is the decision of the California Railroad Commission.

Street car fare is increased from 6 cents to 7 cents and ferry fares are advanced from 18 cents to 21 cents, pending decision on the company's application for permanent higher rates, hearings on which will be resumed Feb. 3. The temporary rates were set to go into effect on Jan. 15.

It had been thought that there would be no temporary increase in ferry rates because the Southern Pacific rates will remain at 18 cents until the outcome of the hearings for permanent increase asked by this concern. The Railroad Commission, however, surprised nearly every one by granting a temporary raise in Key company ferry rates, and letting the 18-cent Southern Pacific rate stand.

The new rates awarded the Key company, it is estimated, will take care of the increases in pay given the platform men, amounting to between \$400,000 and \$470,000 for 1926, and enable the road to meet its fixed charges and pay its bond interest.

The 1-cent increase in street car fares, it was found, will bring in additional revenue of \$526,000 and the 3-cent advance in ferry rate an additional \$250,000. In addition the increase in monthly commutation rates from \$4.80 to \$5.20 will net the company \$64,000 annually, making a grand total of \$846,000.

C. O. G. Miller, president of the Key System Transit Company, said:

After a brief study of the decision the Key System Transit Company is of the opinion that the temporary rates will enable it to meet its operating costs and fixed charges until there can be a permanent readjustment of the rates on the valuation of its property used in public service.

However, the temporary rates are not sufficient to give a reasonable return upon the property so as to warrant the company in making the investment necessary to provide the service which it desires to give the public and to keep step with the growth and development of the East Bay cities.

Not a dollar for improvements comes from fares. It is capital investment and the sums to be spent must be provided by bonds or by money secured in some other manner. It is the primary duty of the Key system to give service and it is the policy of the company to provide such service when and as needed.

The Key system directors fully realize their responsibility in ordering a capital expenditure of nearly \$3,000,000 before proper return has been granted on the value of the company's property dedicated to public service, but these expenditures have been authorized in the belief that the East Bay cities and the State of California want their public utilities to be operated at rates that permit a proper return and protect them from confiscation.

The announcement of the rate increases stirred a storm of protest in

the East Bay, but most citizens have assumed an attitude of watchful waiting and it is believed the resentment that has flared up over the increase in rates will subside if the company gives improved service and puts through its improvement program. On this program are the purchase of two new ferryboats to cost \$1,700,000, the reconstruction of 45 miles of track, the purchase of more buses, the purchase of 120 new cars and improvements at the Key pier.

Contract for the new ferryboats has just been awarded to the Moore Dry Dock Company, Oakland. They will have a passenger capacity of 4,000 each.

Ten-Cent Cash Fare Sought in Syracuse

It is expected that the New York State Railways will at once file its application with the State Public Service Commission for permission to raise the trolley and bus fares in Utica and Syracuse from 7 to 10 cents. Tickets, under the proposed new schedule, would be sold for 7½ cents.

When Benjamin E. Tilton, general manager of the New York State Railways for Syracuse and Utica, called on Mayor Hanna of Syracuse to serve notice on him that the company would apply within a week for permission to increase the fare, Mayor Hanna notified Mr. Tilton he would fight such action.

Rochester accepted the increase of its trolley and bus fares on all lines of the State Railways, effective New Year's Day, without protest.

Authority of Courts in Rate Cases Defined

Public utilities cannot appeal to the courts from mere fear of confiscatory rates or until they have exhausted other remedies provided by law. The Supreme Court has so held in affirming the decision of the lower courts in the case of the Henderson Water Company against the North Carolina Corporation Commission. In 1922 the water company applied to the commission for an increase in the rates over those fixed in the franchise granted a predecessor corporation in 1896. The commission permitted an increase of 10 per cent for a test period of six months. Before this test period expired the company, fearing that the increase would not be continued, applied to the court for an injunction against a reduction. Its petition was dismissed in the trial court on the ground that no order for reduction had been issued and that the law creating the State Corporation Commission provided other means of appealing from decisions of the commission. The Supreme Court, in a decision by Chief Justice Taft, agrees with the reasoning of the lower court.

Seven-and-a-Half-Cent Fare in Philadelphia Upheld

The 7½-cent fare charged by the Philadelphia Rapid Transit Company, Philadelphia, Pa., was upheld in a ruling by the Public Service Commission of Pennsylvania in Harrisburg on Jan. 12. The ruling makes permanent the temporary order of the commission of Sept. 8, 1924, which had been affirmed by the Superior Court, and was based upon the record showing in large part the actual experience of the company since the temporary order of the commission increasing the fares has been in effect.

The majority vote was cast by W. D. B. Ainey, chairman, and Commissioners Benn, Shelby and Stewart. A dissenting opinion from the findings and order of the commission will be filed by Commissioner Martin. Commissioners Scattergood and Evans reserved the right to express their views in a joint report issued on Jan. 13.

In general the commission found that the gross revenue produced by the rates of fare did not exceed the requirements of the company for operation, maintenance, and renewals, plus a reasonable fair return upon the \$200,000,000 minimum valuation found by the commission in 1923.

The case now settled has been under procedure since the fall of 1924, when the company applied for an increase in its rate of fare from 7 cents cash with a 6½-cent ticket rate to an 8-cent cash fare with a 7½-cent token rate. Not only were the hearings in the matter long drawn out but they were very often stormy ones.

In fact, the fare issue caused a breach between Governor Pinchot and his commissioners, which had many serious consequences. After the temporary order was issued Governor Pinchot publicly criticised the commission for its action. Shortly thereafter Samuel M. Clement resigned from the commission in protest against the Governor's denunciation. Later Governor Pinchot, while the hearing was still in progress, requested the resignation of Commissioners Benn and Shelby. Both these commissioners refused to accept the Governor's action and appealed to the State Supreme Court, which some weeks ago handed down a decision in their favor.

Gene McDonald's Gypsy Girl on the Air

Electric railway men will probably want to listen in on station WNAC on the evenings of Jan. 19 and 20, beginning at 8.15 p.m., when the Boston Elevated Musical Club's musical comedy, "The Gypsy Girl" by Gene McDonald, will be broadcasted from the famous Symphony Hall in Boston.

Discussion of Traction Resumed in Chicago

Hearings have been resumed in Chicago with a general air of expectation that, with the traction ordinances expiring in less than a year, everybody means business. At a number of sessions Samuel Insull, Leonard Busby and Henry A. Blair, the latter through an attorney, submitted to personal questioning or furnished the material for aldermanic discussions. The outgrowth of the final tense session was a request that the three traction leaders draw up their own ordinances to determine on paper where their points of agreement rest.

Mayor Dever was dragged into the session after hearing reports of bitter words from the Aldermen for his previous absences.

Mr. Busby said that the traction interests were practically united in 1925 and were "even more so now."

Samuel Insull was absent. He received a broadside from the Mayor for his \$23,000,000 elevated extension program, which has been hanging fire two years. The Mayor said the offer was made "to make a record," and that if Mr. Insull had wanted to build a cross-town elevated line and additions to the present structures to furnish additional express service he could have done so in the same way as he had started his loop platform extensions, which he sincerely wanted built.

Mr. Busby and Mr. Blair favor unification. Mr. Blair's program of "one city-zone fare" is before the committee. Mr. Insull wants most a subway and asked the members of the committee to permit him to build one, if they were not prepared to proceed.

The city was informed that some kind of a long-term grant, preferably, a good-behavior terminable permit, was essential to uninterrupted service.

The Aldermen have had it made plain to them that the Chicago Surface Lines are affording a service never before equalled in Chicago and that in spite of the blind future are developing morale and equipment to the highest possible point.

\$110,123 Bonus in Los Angeles

Final figures show that the Los Angeles Railway, Los Angeles, Cal., paid \$110,123 to 2,208 trainmen on Dec. 15 as bonus for faithful and efficient service during the period Dec. 1, 1924, to Nov. 30, 1925. In the *ELECTRIC RAILWAY JOURNAL*, issue of Dec. 19, 1925, page 1089, it was said that the amount would be about \$106,000. This was the sixth year of the merit and bonus system and the amount paid the trainmen was higher than in any previous year. In 1920, when the merit system was established, 1,500 men received \$50,000.

The bonus is paid on a basis of \$5 a month or \$60 a year. Trainmen are eligible for the bonus after they have been in the service for six months. At the time he becomes eligible each trainman is given an efficiency rating of 100 per cent. A clear courtesy and safety record for the month entitles the trainman to the full \$5, but demerits assessed against him for infractions of the rules or for complaints made for

discourtesy or inefficiency lower his record from the rating which he is given to start with and decrease his bonus at the rate of 25 cents for each five demerits. Commendations for particularly courteous and efficient service from patrons or supervisors add to the percentage of the trainman's efficiency rating.

R. R. Smith, assistant superintendent of operation, presided over the meeting on Dec. 15 at which the Christmas money was distributed.

Guelph Favors Return of Local Municipal Control

In the recent municipal election for the by-law favoring the return of the Guelph, Ont., system to local municipal control, a large plurality was recorded. The Guelph system has been operated for the past four years by the Hydro-Electric Railways, which is controlled and operated by the Hydro-Electric Power Commission of Ontario. As the situation now stands, some of the city's leading business men believe it would be wise to scrap the system and depend upon the bus.

Some years ago Guelph, at its own expense, built a railway line to Guelph Junction to connect with the Canadian Pacific Railroad, a steam line, about 15 miles away. Later this line was extended to Goderich by the Canadian Pacific and Guelph now collects toll on every ton of freight passing over this important grain route. Several years ago some of Guelph's leading business men conceived the idea of having the street railway operated by the steam line and it was generally accepted as an opportunity to secure efficient administration, plus the fact that there had been a desire for outside radial connection, which this proposal would have effected. When arrangements were in the making the late Sir Adam Beck started a campaign against such management by an "iniquitous corporation" and he succeeded in persuading the people of Guelph at the eleventh hour not to accept an arrangement to have the road operated under conditions offered by the Canadian Pacific Railway, although such conditions were reputed to be very favorable.

The recent vote, favoring a discontinuance of Hydro operation, was recorded in the face of opposition from local Hydro supporters. They predicted that it was the first step toward a new deal with the Canadian Pacific Railway. A local newspaper states that in the years ensuing since the Guelphites have been under Hydro management the road has been improved, but with their own money; that deficits and not dividends have been the yearly portion, and that outside connections never materialized.

Coal for Boston Elevated Employees

The Boston Elevated Railway, Boston, Mass., has made agreements with the Fore River Coal Company covering storage of bituminous coal in pocket at the Lincoln Power Station wharf. Employees desiring this kind of coal delivered at the wharf at \$6.50 a ton may apply to the superintendents of divisions.

Three Thousand Greet Santa Claus at Beaver Valley Party

Santa Claus called at the Beaver Valley Traction Company Christmas party on Dec. 23 for the fifteenth year.

Arrangements for his reception had been made at the pavilion, Junction Park, where more than 3,000 greeted him and hundreds of children and adults delved into his pack, carrying away generous gifts.

The pavilion was handsomely decorated and a wonderful tree was located in the center, in which myriad lights flashed in its ice-covered branches.

Motion pictures were shown for the children, while the adults were entertained by a large chorus which sang Christmas carols. The singing was accompanied by electric chimes installed for the occasion. There were peanut and marble scrambles for the children.

The "Traction Company Party" has become a fixture in the valley. Many children who attended the first party as babes in arms were present and reported having attended each year. Many adults also have attended the party annually since the practice was started fifteen years ago.

Each year the number who attend increases. Committees and chairmen strive to make each party better than the preceding one. New gifts are selected, new entertainment arranged and more care is given to decorations and refreshment menus.

John R. Marshall was general chairman in charge of the party.

Open Hearings on Baltimore Rerouting Plans

The Traffic Commission at Baltimore, Md., has set dates for public hearings at which four plans have been advanced for rerouting the cars of the United Railways & Electric Company will be discussed. The hearings are to be open to the public. The dates are Jan. 18, 19 and 20. The four rerouting plans have been prepared as a result of a survey by Kelker, De Leuw & Company, Chicago. Following the completion of the street car rerouting plan the commission will turn to the vehicular traffic problem.

New York Traction Companies Show Insufficient Revenues

The annual report of the New York Public Service Commission with jurisdiction throughout the state but not in New York City, sent to the Legislature on Jan. 11 shows that the revenues of this group of utilities have been insufficient to meet operating expenses and fixed charges. A slight decrease in operating revenues in 1924 over 1923 is more than offset by lower operating costs, it is said. The net loss for 1924 was approximately one-half that for 1922, "this seeming improvement being in part undoubtedly due to the discontinuance of various unprofitable lines and not wholly to increased efficiency in operation or increased traffic." On Dec. 31, 1924, there were 1,934 miles of road reported as available for operation compared with 1,999 and 1,971 at the close of the years 1922 and 1923 respectively.

New Franchise Voted in Sioux City

Sioux City, Iowa, voters recently reversed their decision of 1924 and approved a 25-year franchise to the Sioux City Service Company, operating the city traction lines. The vote was favorable in each of the 30 precincts, but only 7,580 votes were polled, dividing 5,546 in favor of the proposition and 2,034 against it.

The new franchise provides for an eighteen-hour service on all lines, removal of the Third Street tracks, elimination of the wye at Transit and Morningside Avenues, maintenance of the present fare of 7 cents, four tickets for 25 cents, as long as the company is able to show a 7 per cent return on its investment, but a reduction if this figure is exceeded; payment to the city of 2 per cent gross receipts in place of a \$25 tax annually on each car and extension of tracks without specific franchise vote.

Nashville Sets Record for Safe Transportation

The street cars of Nashville, Tenn., operated by the Nashville Railway & Light Company, ran 1,025,000 miles in safety during 1925. This announcement was made when the 400 operators held a mass meeting in the Employees' Mutual Benefit Association auditorium during the last week in December, where they were praised for their work.

A great amount of credit for the record was given to H. A. Davis, superintendent of transportation, and to John J. Connors and the safety school, of which he is director, attended by 400 operators weekly. The local report for the year showed that the number of accidents had been reduced 328 during 1925 and that all cars had averaged traveling 6,577 miles per accident.

Official national recognition of the 1925 record was given by the men in a telegram from J. W. Welsh, secretary of the American Electric Railway Association in New York. He declared that the national average was far below the local record, for which he sent his congratulations.

More Transit Facilities, Says New York's New Mayor

J. J. Walker, New York's new Mayor, says it is time the traction controversy was ended and that the city had full and complete power to develop its own facilities to take care of its own transportation needs. As he sees it, this is entirely a local question which must be solved by the expenditure of local funds and does not affect any other community in the state. The Mayor feels that since it is entirely the city's money that is being spent and the city's needs that are being satisfied, the right of control, as well as of construction, should be vested in city authorities.

His administration will not permit of unnecessary conflict or controversy. In his inaugural address the Mayor said:

Let the credit go where it will, but let us have better transit facilities. This administration will not seek to glorify itself at the expense of delay in this most essential necessity. More transit facilities must be

provided without any kind of political or personal interference.

The city is entitled to the co-operation of the State Legislature in its efforts to provide the additional transit facilities that are required. It is generally understood that the revenues from taxation are not sufficient to pay for the construction of the transit lines that are necessary, and that recourse must be had to the credit of the city.

The borrowing capacity of the city under the present constitutional limit is not enough to construct these new transit lines as rapidly as the needs of the population demand. We shall ask the Legislature to permit the people to vote upon an amendment to the constitution to extend the city's borrowing capacity. At the time the present constitution was written it was never contemplated that the use of public funds would be necessary to provide transportation facilities or that the cost of transportation would reach the enormous amount that it has in later years by reason of requirements for subsurface construction. We are asking now to have the constitution brought up to modern conditions.

Bus-Railway Service for Celebration

Final details of local transportation in Philadelphia, Pa., during the Sesqui-Centennial celebration have been worked out by the city and the Philadelphia Rapid Transit Company. The expenditure by the railway will be about \$2,100,000, of which \$1,200,000 will go toward track extensions outside the Sesqui-Centennial grounds, \$600,000 for extensions to the company's power distribution system required to meet the added load and \$300,000 for intramural transportation. An extension of bus service is included in the plan. The company's outlay will be financed through the sale of its 7 per cent preferred stock, an issue of which was authorized recently by the Council.

Rights of State Commission Fixed in Duluth Case

The constitutionality of the act of 1921 which gives the State Railroad and Warehouse Commission of Minnesota control over electric railway rates and financing has been upheld. In the case under review the city of Duluth obtained a temporary injunction, restraining the state commission from acting on a petition of the Duluth Street Railway for an increase in fare. Three district court judges in Duluth upheld the 1921 act. This would dismiss the injunction. The city has announced, however, an appeal will be taken to the Supreme Court.

The city attacked the constitutionality of the act when the Duluth company asked the commission to set a new rate of fare in Duluth. The railway contended that the 6-cent fare then in effect yielded only 70 per cent of a fair return on the capital investment, as determined by the United States District Court.

Eight-Cent Fare in Effect in Rochester

An 8-cent cash fare went into effect on the Rochester, N. Y., trolley and bus lines of the New York State Railways on Jan. 1. The previous fare was 7 cents, in effect since the service-at-cost contract between the city and the railway was signed five years ago.

Early in December the railway filed with the Council notice of the fare in-

crease. This action was based largely on the report of Commissioner of Railways Charles R. Barnes, which pointed out the necessity of a higher fare.

City officials did not oppose the advance. In fact, they agreed that it was justified by figures contained in the report of Mr. Barnes. Under the provisions of the service-at-cost contract fare changes do not have to be approved by the State Public Service Commission.

Under the new schedule four tickets will be sold for 30 cents. Prior to the advance four tickets were sold for 25 cents.

Passenger Traffic Holds Up Well in Syracuse

The Syracuse Railways Co-ordinated Bus Lines, Inc., subsidiary of the New York State Railways, carried 1,124,057 passengers on its lines during 1924, according to a report issued by Benjamin E. Tilton, vice-president and general manager of the corporation. This was the first yearly report on bus service for Syracuse.

The street car lines carried 32,418,356 passengers during the year. The total number of passengers, bus and trolley, was 33,542,413. This is a drop of 29,015 fares from the total for the previous year, 33,571,428.

New bus lines installed in Syracuse during 1924 are: Strathmore, Shotwell Park, Colvin Street shuttle and West Genesee lines. The Chittenango inter-urban route also was started during the year.

A bus line through South and North Geddes Streets to accommodate workmen going to and from factories is under consideration.

Frederick H. Fay, Boston, planning expert, is in Syracuse making a study of the entire traffic system. Mr. Fay has held several conferences with Thomas H. Mather, consulting engineer to the grade crossing commission, and city officials.

Power Deal Made at Columbus, Ohio

Announcement was made on Jan. 4 of the consummation of a 99-year contract, approved by the Ohio Public Utilities Commission, between the Columbus Railway, Power & Light Company and the Scioto Valley Railway & Power Company, whereby the former acquires valuable rights of way for transmission lines between Columbus and Lancaster, Ohio, and Columbus and Chillicothe, Ohio, over the Scioto Valley routes, and the Scioto Valley company in turn acquires exclusive rights to haul Rail-Light fuel and also agrees to buy all its energy from the Rail-Light company.

The contract forecasts the dismantling of the Scioto Valley power plant at Reese Station, Ohio. It also forecasts arrangements whereby the Rail-Light company will take over municipal power and light contracts at Chillicothe and Circleville, now held by interests closely associated with the Rail-Light company, and perhaps similar municipal contracts in other communities.

It is provided that the arrangement for the operation of Scioto Valley company cars in Columbus over Rail-Light company tracks shall continue.

Southern Pacific Seeks Fare Advance

On the heels of the higher fares granted the Key System Transit Company, Oakland, Cal., temporarily as a relief measure to meet the increase in wages recently awarded carmen by an arbitration board, the Southern Pacific has applied for an increase in rates to the California Railroad Commission.

The Southern Pacific requests that it be allowed to raise ferry fares to 25 cents for single trips and to charge \$6.50 for monthly commutation. The present rates are 18 cents and \$4.80.

A hearing on this petition will be held on Jan. 18 in San Francisco, but before that time—on Jan. 15—the new Key rates will take effect and for several days the Southern Pacific will be in the position of a rival line charging lower rates than its competitor.

Company officials claim that the new rates are needed to meet a deficit in revenues incurred during the first six months of last year. An application for permanent increase in rates is now before the commission. There have been several hearings, but the matter has been postponed until February. In its prior application for a rate increase the Southern Pacific did not go on record as requesting any definite amounts, leaving that to the commissioners after study of the testimony.

Fort Dodge Still Carless

Although the option on leasing the railway system of Fort Dodge, Iowa, dormant since Nov. 14, has expired, no statement as to probable resumption of service has been made public by the syndicate of residents which announced it would lease the trolleys. The Fort Dodge Street Railway, which operated the local cars in Fort Dodge for about 30 years, suspended service on Nov. 14.

The history of the railway and the company which began bus service was given in the *ELECTRIC RAILWAY JOURNAL*, issue of Nov. 28, 1925, page 975.

News Notes

One-Man Car Matter Up Again in Milwaukee.—The City Council of Milwaukee, Wis., has adopted a resolution asking the Railroad Commission for a rehearing of its recent order authorizing the Milwaukee Electric Railway & Light Company to use one-man cars on its Walnut Street line.

City Employees Must Pay Fare.—An ordinance has been recommended for passage by the City Council utilities committee of Seattle, Wash., amending an existing ordinance which permits policemen and firemen to ride free on the Seattle Municipal Railway. Under the new ordinance, these city employees will have to pay their street car fares. When the Council was working on the 1926 budget, it reduced an appropriation for policemen and firemen for car riding from \$48,000 to \$5,000, despite protests from the fire and police chiefs, who said the amount would not provide for the men's carfare, even limited to rides on official duties.

Company to Resist City's Fare Plan.—The Lynchburg Traction & Light Company has notified the city of Lynchburg, Va., that it will resist by injunction, if necessary, the effort of the city to cut the street car fare from 6 to 5 cents in the new part of the city. The railway is to ask for an injunction from the State Supreme Court of Appeals, and if this is granted the city will ask the court to require the giving of a receipt to all who pay the 6-cent fare so that there may be an adjustment in case the city wins the contention. The city's plan is to have the fare similar throughout the city.

Men Remain at Work During Wage Adjustment.—Trolley men of the East Penn Electric Company, operating 36 miles of track between Pottsville and Mauch Chunk, recently demanded an increase of 5 per cent in wages. The former wage scale expired with the old year. The men decided to work for 30 days while a new scale is being adjusted. The company contends it cannot grant any increase of wages and might even curtail service because of the loss of business due to the mine strike.

What Can You Send?—The Los Angeles Railway, Los Angeles, Cal., is soliciting old photographs, time-tables, tickets or other material to show some of the history and development of the Los Angeles Railway. R. B. Hill, superintendent of operation, is at work compiling a book which will illustrate the history and development of that property. He is anxious to make the volume complete with pictures and records. He has promised to return the photographs immediately after they have served his purpose. Data should be forwarded to Los Angeles Railway Building, Los Angeles, Cal.

Wage Agreement Reached.—Under a recent agreement between the union and the Toledo, Fostoria & Findlay Railway, Fostoria, Ohio, trainmen will receive 47 cents an hour for the first year, 49 cents for the second year and 52 cents for the third year. Shop men will receive 55 cents an hour and track men 40 cents an hour.

Town Wants Railway.—The town of Long Beach, Miss., which had formerly adopted an ordinance authorizing the Mississippi Power Company to remove its tracks and abandon its trolley service within the town limits, by a close vote of its Board of Aldermen on Jan. 5 reconsidered its former action. It requested the company to resume railway service, and set Jan. 28 for the day upon which the townspeople will vote to establish their permanent public policy on the electric railway question. Meantime, the company, acting upon authority of the town's ordinance, suspended railway service, and has been operating motor coaches on the line.

Wage Issue Up Again.—Railway employees of the Cedar Rapids & Marion City Railway, Cedar Rapids, Iowa, who last July accepted a compromise on their 5-cent wage increase petition, on promise that the full scale would be granted if increased earnings warranted it, have opened negotiations to secure that scale. The traction lines, granting a 2½-cent increase in July, said if earnings under the new fare

were sufficient the other 2½ cents would be granted. The men claim that condition exists, but the management says earnings are "nowhere near" the estimate. The matter will be considered in conference.

Company Receives Colors.—The Chicago, North Shore & Milwaukee Railroad Post No. 753 of the American Legion was officially presented with its colors by the railroad officials in Waukegan on Dec. 17, 1925. The North Shore Railroad Post is composed entirely of railroad employees. Every department is represented in the legion, with the largest number from the transportation department. The ceremony of presentation of colors and standards included the presentation address by Charles E. Thompson, assistant to the president of the company, "on behalf of the North Shore Line." The acceptance address was made by Claude L. Foubare, Illinois Department, American Legion. Many fine musical numbers afforded enjoyment for all participants.

New Order on Commutation Tickets.—By special permission of the Public Service Commission commutation tickets of the Southern New York Railway, Inc., Oneonta, N. Y., each good for 50 trips in either direction between Hartwick and Junction within 30 days from and including date of sale, will be sold for \$6.50 each. The order became effective on Jan. 11.

Fare Appeal Heard.—A. D. Mackie, general manager of the Illinois Power Company, Springfield, Ill., testifying before the Illinois Commerce Commission recently in support of the petition to increase fares to seven for 50 cents from the present rate of four for 25 cents, outlined several contemplated changes in lines and substitution and extension of bus lines. He said passenger revenue had declined from \$713,008 in 1922 to \$684,432 in 1924, while operating expenses had grown from \$533,143 to \$563,990. The company contends that its earnings are at a rate considerably less than the 7 per cent return set by the commission.

Service Improved.—Indicative of the "please the public" policy adopted by the Steubenville, East Liverpool & Beaver Valley Traction Company, G. S. Wills, general superintendent, recently announced completion of improvements costing approximately \$500,000. The improvements include the operation of the Ceramic flier, providing a Pullman car service between Beaver, Pa., and Steubenville; the maintenance of a faster schedule between terminals on the interurban line, with the idea of safety first in the operation, and faster schedules all over its upper Ohio Valley system.

Windshield Wipers for Trolleys.—Garfield S. Chase, manager of the local division of the Eastern Massachusetts Street Railway at Lawrence, Mass., has announced that the road plans to equip all the street cars with wipers such as are used on the windshields of automobiles. The idea will be applied throughout the entire territory in which the road operates. It is understood the wipers will be similar to those in use in Detroit and other cities, particularly in the central West.

Recent Bus Developments

New Jersey Board Wants Greater Authority Over Buses

In the opinion of the Board of Public Utility Commissioners of New Jersey the law for the regulation of the buses has not kept pace with the development of bus transportation. This is the view expressed by that body in transmitting its suggestions to Governor Silzer for action. In 1921 the public utility act was amended to include among the public utilities subject to the board's jurisdiction the operators of auto buses upon routes any part of which parallels on the same street the line of a street railway. There were excluded from the application of the act those operating under permits granted prior to March 15, 1921, and renewed on their expiration to the same owner for the same route.

The purpose of the amendment appears to have been to subject to regulation by the Public Utility Commission the operation of buses in direct competition with street railways, leaving free from such regulation those not in such competition and those already established in the business. The amendment did not provide for the granting by the board of permits to operate. The public utility act provides, however, that no privilege or franchise granted shall be valid without the board's approval.

The prospective operator of a bus, therefore, must first obtain licenses from the municipalities along his route and submit these to the board with an application for its approval. According to the board this procedure is simple and free from objection when the operation is in a single municipality, but during the past year the board has received numerous applications for approval where the routes passed through a large number of municipalities.

In some cases it has been proposed to parallel at various points the routes of existing bus and railway lines, without any necessity for additional transportation facilities at such points. In other cases it was evident the existing transportation facilities were inadequate and the bus service needed. In considering these applications the board met with many complications due to the lack of a law adapted to present-day conditions. It happens frequently that along a route extending through a number of municipalities permits are granted by some, while other municipalities refuse the grants or fail to act. This results in the buses running through some of the municipalities with the doors closed, doing no local business. In other cases the bus operators have attempted to stop in such municipalities at stations on private property.

In many of the jurisdictions the business of bus transportation is classified as follows:

(a) Urban or street transportation by buses within the limits of a single municipality.

(b) Interurban transportation, where the route is through numerous municipalities over long distant routes.

In the board's opinion a classification such as this is desirable and should be provided for either directly by law or by legislation authorizing the board to fix the classifications. In either event it should be specified that where the operation is within the limits of a single municipality it should be within local control to grant permits, subject to the prevailing conditions. Where the operation is interurban it is the board's opinion the prospective operator should receive from the state through the agency of the Board of Public Utility Commissioners a certificate of convenience and necessity for the operation, and that this should be regarded as sufficient authority to operate, subject to police regulation in each municipality.

It is suggested also that the law be changed with respect to the operation of buses in interurban traffic, so that buses so operated will be subject to the board's jurisdiction, without regard to whether any part of the route parallels on the same street the line of a street railway. As the law now is, it may be proposed to operate a bus between points not connected by a street railway, but if any part of the route, no matter how short, is upon a street in some municipality where there is a street railway track the operation is subject to the board's jurisdiction. If this part of the route is avoided the board has no jurisdiction. The result is that many of the long route buses are so operated as to avoid paralleling a street railway or operated in parts of the state where street railways are not in operation.

The board says that interstate bus lines are being multiplied without regard to public convenience. It refers to the fact that legislation to provide proper governmental supervision of this business has been under consideration by the commissions of various states, but says it is evident that congressional action may not be had immediately, and that with the rapid growth of the intrastate routes and the addition of the operation of the interstate buses to the present bus and other vehicular traffic the state will be soon confronted with a serious problem of congested traffic on the highways.

The law now provides that the operators of all buses in cities shall carry liability insurance. It recommends:

We are of the opinion that legislation should be enacted requiring the operators of all interstate buses to carry liability insurance in a reasonable amount for the benefit of persons injured through their operation; that policies for such insurance be filed with the Commissioner of Banking and Insurance, or some other suitable department, and that no operation of interstate buses be permitted in this state unless such requirements be complied with. This we believe is a proper exercise of the police power of the state and is not an interference with interstate commerce. It is a necessary regulation in the interest of the public safety.

Bus Route Supplants a Trolley Line in Youngstown

The Youngstown Municipal Railway, Youngstown, Ohio, suspended service on Jan. 10 on the North Avenue car line, which serves a part of the northern section of the city, and substituted therefor bus service covering the same general section. The trackage taken out of service was 1.35 miles. The street car line was single track with passing switches. This made it impossible to improve service. Service on the line was further handicapped by a difficult grade crossing of the Erie Railroad.

By the operation of the bus line over a recently constructed bridge and for a part of the route through a broader street the handicaps to service have been overcome. The bus route, 2.4 miles in length, also permits of extension of service to a recently developed section of the city heretofore not directly served by the railway lines. The buses used in the new service are the standard city type of the company on White chassis.

Bus Transportation Grows in Madison

The Madison Railways, Madison, Wis., on Jan. 7 purchased all of the equipment of the Wingra Bus Company and will operate that bus line. The Wingra Bus Company for several years has operated an intracity bus line in Madison. The equipment purchased included five large buses. The transfer of ownership was made with the provision that the purchaser will continue fifteen-minute service from the Capitol to Wingra Park. The new line will be run in conjunction with the bus line of the railway. Fifteen-minute service will be furnished from all parts of the city.

Fares will prevail at 10 cents cash for adults and 5 cents for children, with tokens at seventeen for \$1 for adults and ten for 50 cents for school children.

Express Service Between Richmond and Petersburg.—A through bus service between Richmond and Petersburg has been established by the Virginia Electric & Power Company. The trip to Petersburg, about 22 miles, consumes one hour. With the exception of stops to be made at the local hotels to pick up passengers, the service is an express service direct to Petersburg. The certificate granted by the Virginia Corporation Commission to operate a bus line was bought by the company recently from C. W. Edgerton, who purchased the right when the line was sold early in December.

Suggests Buses to Recoup Losses.—The Tri-City Railway, Davenport, Iowa, has asked the City Council to authorize the introduction of buses along the streets now served by the Fejervary and LeClaire Street car lines, at the same fare as the street car. Four buses would be regularly operated and six used in peak-load hours, with transfer interchangeable on both lines.

Financial and Corporate

Agreement on St. Louis Reorganization

Security Holders Reconcile Differences
—Hearing on Foreclosure Suit
Set by Court for Feb. 15

Security holders of the United Railways, St. Louis, Mo., have agreed on terms for the reorganization of the system. Federal Judge Faris of the Eastern District of Missouri was so informed on Jan. 5. As a result the court continued until Feb. 15 the hearing on the consolidated foreclosure suits brought against the property under which the receivership will be dissolved.

The mill tax debt of \$3,000,000 owed the city of St. Louis has not been adjusted, but Judge Faris announced that this would not prove an obstacle to reorganization, since it is a matter for the city and company to settle independently.

The last financial barrier to reorganization was the objection of holders of \$30,300,000 of general 4s to the reorganization committee's plan to extend \$8,300,000 of underlying bonds, \$4,200,000 of which had been replaced with receiver's certificates. These will be paid off, but it is understood that \$6,000,000 of new bonds will provide the capital needed for this purpose.

When Assistant City Counselor Senti informed Judge Faris that the mill tax matter had not been adjusted, the Judge replied:

The mill tax cannot stop this proceeding. It is either a preferred claim or it is not a preferred claim. I allowed the city to participate here more as a matter of grace than of law.

The reorganization committee has indicated that it will endeavor to compromise the mill tax on the same basis it settled \$500,000 in personal injury judgments, namely, payment of 66½ per cent of the principal and interest. It will probably ask ten years to pay.

Mr. Mitchell, counsel for the holders of \$9,700,000 of St. Louis Transit Company bonds, made a brief statement in which he advised the court of the complete agreement of the security holders. He stated that within ten days he would file an amended bill of foreclosure. Claims against the company will be heard after this and the termination of the receivership will follow a decision as to the payment of these claims. It is probable that the mill tax matter may be adjudicated when the question of claims comes up.

Judge Faris said he hoped the matter would be pushed to a termination with all possible speed.

The reorganization is based on the assumption that the company will be permitted to earn 7 per cent on \$57,000,000. The plan provides that the bonded debt be cut to \$40,800,000 from \$54,890,000. The present \$24,913,000 of common stock will largely be wiped out, but holders of \$16,383,000 of preferred stock will have an opportunity to subscribe to 343,645 shares of new

common at \$12.50 per share. Holders of the \$9,070,000 St. Louis Transit bonds will receive 53,854 shares of new preferred.

The United Railways went into receivership in April, 1919. Several plans for reorganization were drawn, only to be rejected. In January, 1924, Judge Faris forced the issue by refusing to authorize Receiver Wells to extend three issues of underlying bonds totaling \$4,100,000 and two issues of Suburban bonds totaling \$6,500,000.

The active reorganization plans for the company were in charge of Newman, Saunders & Company, New York.

The St. Louis Public Service Company filed articles of association with the Secretary of State of Missouri on Jan. 13 and is to take over the properties of the United Railways if the reorganization plans are approved by the federal court and the Missouri Public Service Commission. The purchase of the properties would be at foreclosure sale and the new company would operate the system pending discharge of the receivers. The new company has a nominal capitalization of \$15,000, but upon purchase and with the approval of the Public Service Commission additional securities based upon the amount invested in the system as determined by the commission would be issued. The incorporators named in the articles of association are members of the reorganization committee and men employed by them. They are: F. O. Watts, A. L. Shapleigh, J. Sheppard Smith, W. W. Smith, George W. Wilson, W. De W. H. Bradley, S. W. Greenland, L. C. Datz, Thomas Stanion, Stanley Clarke and J. K. Newman. Some of these men will occupy the position of director temporarily pending the election of permanent officers.

Marion & Bluffton Traction to Pass to Insulls

Purchase of four electric light and power and electric railway properties in eastern Indiana by the Indiana Service Corporation, a subsidiary of the Midland Utilities Company, of which Samuel Insull is president, is proposed in a petition filed on Jan. 7 with the Public Service Commission of Indiana.

The properties which it is proposed to merge with that of the Indiana Service Corporation are the Marion & Bluffton Traction Company, Berne Electric Light Company, the Bryant Electric Company and the Wells County Electric Company.

The value of the properties to be purchased is \$1,594,197, according to the petition.

With the acquisition of these properties the Indiana Service Corporation will serve 39 communities with electric light and power and 37 towns will be interconnected by the company's electric railroad lines.

Operation of the combined properties will be under direction of Robert M. Feustel, president of the Indiana Serv-

ice Corporation. No change in the working organization of the companies to be bought is contemplated.

The Marion & Bluffton Traction Company supplies electric service in communities south of Fort Wayne and operates an electric railway from Bluffton to Marion. As the Indiana Service Corporation already owns an electric railroad running between Fort Wayne and Bluffton, purchase of this new line will give the company a railroad connecting Fort Wayne and Marion.

The proposed purchase price of the Marion & Bluffton Traction Company is \$1,403,953, subject to first mortgage bonds aggregating \$504,000 and equipment gold notes totaling \$32,000.

Gain in Traffic in November—Slight Loss for Eleven Months

There was a further and augmented increase in the traffic carried on electric railways during November, 1925, compared with November, 1924. The total number of revenue passengers, including bus passengers, reported to the American Electric Railway Association by 208 companies for the two months was as follows:

November, 1925	777,372,289
November, 1924	754,569,183
Increase	3.02 per cent

For the period of eleven months ended Nov. 30, 1925, compared with the similar period in 1924, the figures are as follows:

1925	8,573,758,955
1924	8,615,448,432
Decrease	0.49 per cent

Dry Dock Road, New York, Passes Interest Payment

The directors of the Dry Dock, East Broadway & Battery Railroad, New York, a part of the Third Avenue Railway System, has adopted the following resolution on the payment of interest on the \$649,361 outstanding Series C refunding 5s of the former company:

Whereas there is due and payable on Jan. 1, 1926, an installment of interest on the bonds of Series C issued by this company as of July 1, 1915, and secured by the refunding mortgage made and executed by this company as of July 1, 1915; and

Whereas this company has not sufficient funds to pay such interest, and the earnings of this company have been insufficient therefor; now therefore be it

Resolved, That the officers of this company be, and they hereby are, directed to make no payment on account of the interest due Jan. 1, 1926, on the said Series C bonds of this company.

Requiem Sung for Phoenix Company

The Phoenix Railway, Phoenix, Ariz., was granted a judicial decree of dissolution by Judge Joseph F. Jenckes in the Maricopa County Superior Court on Dec. 29. The properties of the company were sold to the city of Phoenix not long ago for \$20,000.

The petition for the decree was signed by the nineteen stockholders of the passing corporation. It was incorporated 43 years ago for \$2,000,000, consisting of 20,000 shares of stock at a par value of \$100. The petition for the decree, according to the local attorneys for the Sherman interests, has no significance other than the desire officially to close the business of the corporation.

\$3,956,494 Net Income at Detroit

Accountants for Municipal Line Give This Figure of Operating Results
for Period from Jan. 1, 1924, to June 30, 1925, Including \$1,555,183
for Renewals and Replacements

THE third annual report of the Department of Street Railways at Detroit, Mich., for the fiscal year ended June 30, 1925, has just been issued. According to the audit by Price, Waterhouse & Company the net income from Jan. 1, 1924, to June 30, 1925, was \$3,956,494. The report gives operating data for the fiscal year, but the audit shows the financial results covering the eighteen months period and is a continuation of the audit by Price, Waterhouse & Company as of Dec. 31, 1923.

The financial review contains also an audit by Price, Waterhouse & Company, giving \$7,114,246 as the amount of "Surplus and Reserves," representing the city's equity in the street car lines after providing for accrued depreciation on the property to June 30, 1925. Without allowing for depreciation, this equity is fixed at \$10,241,771. This latter sum is made up as follows: Debt retired from operation, \$3,367,885; sinking fund reserves, \$4,762,790; additions to property, \$2,111,096.

The annual report shows that the D.S.R. had on June 30, 1925, 359.14 miles of running track, 2.51 miles of sidings, 5.87 miles of carhouse tracks under cover and 23.43 miles in the open, making a grand total of 390.95 miles. The total mileage embraced in the motor coach system as of the same date, one-way route-miles, is given as 49.14 for the thirteen routes.

SCOPE OF THE AUDIT

It is pointed out that the department furnishes transportation facilities for the cities of Detroit, Highland Park, Hamtramck and Springwells (now Fordson). Ninety coaches were purchased during the year and 89 coaches were being operated on June 30, 1925, with a combined seating capacity of 1,953 passengers.

The audit was so conducted as to enable the auditors to certify to the general accuracy and integrity of the accounts. The examination was stated to be of such a nature as would determine the substantial accuracy, or otherwise, of the accounts and records, but was not of such a detailed character as would necessarily disclose minor irregularities or inaccuracies, should any exist. The work of the auditors comprised: (a) A verification of the assets and liabilities as of June 30, 1925; (b) a verification of the results from operations during the period from Jan. 1, 1924, to June 30, 1925; (c) an examination of the disbursement vouchers taken up in the accounts during the period from Jan. 1, 1924, to June 30, 1925.

As a result of the auditors' examination and after making certain adjustments necessary to correct the book figures, including a charge of \$1,555,183 in respect of depreciation and accruing renewals of the properties, it is found, as indicated previously, that the operations of the period from Jan. 1, 1924, to June 30, 1925, resulted in a net

income of \$3,956,494. It is pointed out that a considerable number of street cars acquired from the Detroit United Railway under the purchase agreement have been abandoned or retired from service. Inasmuch as the consideration under the purchase agreement represented a composite consideration rather than a total of amounts representing the purchase price of individual assets, the book adjustment necessary in order to relieve the property account of the value of such abandoned equipment was determined on the basis of the arbitrary valuations ascribed thereto by the equipment division at the time of acquisition. Using such as a basis a loss was developed (after allowing for accrued depreciation) amounting to \$158,410, and this has been charged direct to surplus in the accounts by reason of the fact that the retirement from service of the rolling stock had merely been deferred to the period under review.

No specific provisions for depreciation have been made in the accounts of the department up to June 30, 1925, but alternatively, the total cost of the properties is being amortized by appropriations of income in respect to sinking funds for debt retirement and of equipment purchased fund.

In the accounts Price, Waterhouse & Company have given effect to a provision for depreciation calculated on the basis of 3 per cent per annum of the book value of the depreciable properties and for the period of operation to June 30, 1925, the reserve calculated on this basis amounts to \$3,087,484, of which slightly more than one-half, or \$1,555,183, has been charged against the operations for the period of eighteen months ended June 30, 1925.

In their report on the accounts for the period ended Dec. 31, 1923, they calculated depreciation on the basis of 2½ per cent per annum, calculated on the book value of the total property investment, which naturally included non-depreciable properties. They report that they have since been advised by recognized engineering authorities that a rate of 3 per cent per annum applied on the depreciable property would be fair and they have, therefore, adopted this rate. Furthermore, it is understood that it is the intention of the department to give effect in the accounts to the depreciation provisions as calculated to date and to make a relative provision monthly hereafter. The accountants say:

It will be understood, of course, that the creation of this depreciation reserve is in effect merely a transfer to a separate account of parts of what otherwise would be stated as surplus and it is not specifically offset by a corresponding appropriation of cash available for replacement as and when required. The depreciation reserve in this instance is wholly offset by sinking fund investments, which will be applied toward the payment of the cost of the properties.

In discussing the procedure of accounting for expenditures in connection with rehabilitation on which the depart-

ment's records show \$1,965,287 has already been spent, it is stated that "In the present instance the necessity for a prompt survey and report on the rehabilitation of the property acquired from the Detroit United Railway is very apparent. The longer this work is delayed the greater will be the difficulty of separating the rehabilitation costs from the costs chargeable to maintenance applicable to the period subsequent to the date of acquisition on May 15, 1922."

It was recommended in the report on the examination at Dec. 31, 1923, that a rehabilitation budget be promptly prepared by the engineering department and formally adopted by the Board of Street Railway Commissioners so that the basis of future accounting in this respect will be definitely established. It is understood that such a budget has not yet been prepared.

The assessed valuations of the department's properties (exclusive of sundry leased properties) for personal and real estate tax purposes for 1925 in Detroit, Highland Park, Hamtramck, Grosse Pointe and Fordson was \$27,678,622. By a comparison of the total assessed valuation with the depreciated value of the property accounts as shown by the balance sheet as of June 30, 1925, of \$39,498,853 it will be noted that the assessed valuation amounts to approximately 70 per cent of the depreciated value of the properties.

STATEMENT OF FUNDED DEBT

At June 30, 1925, there were outstanding the following funded debt and purchase money obligations, viz.: Construction bonds, \$15,000,000; purchase bonds, \$3,601,000; additions and betterment bonds, \$1,450,000; Detroit United Railway purchase contract, \$14,080,000. In addition, pending the sale of \$3,500,000 additions and betterment bonds, the department was indebted to the city of Detroit in the amount of \$2,602,286, borrowed for the purpose of liquidating liabilities for additions and betterments.

In commenting on sinking fund and reserves, the report states that with regard to the construction bonds, amounting to \$15,000,000, the Department of Street Railways is making sinking fund provisions in accordance with that section of the charter which requires payments to be made into the sinking fund aggregating 75 per cent of the principal by the maturity date of each series. There was, on June 30, 1925, in respect to this issue an over provision of \$340,484.

Maturity of the purchase bonds and of the additions and betterments bonds is being anticipated by setting aside monthly amounts calculated on the basis of days which will equal the principal of each series of bonds as they respectively become due. Interest on these funds is taken up as an earning in the income account. Since the additions and betterment bonds become due in equal amounts annually and the purchase bonds become due in approximately equal amounts annually, this method of setting aside the funds for their redemption is considered as practical as could be suggested.

The reserve for injuries and damages, amounting to \$1,383,379, has been

TOTAL PASSENGERS CARRIED ON DETROIT MUNICIPAL LINES

	Rail Lines	Coach Lines	Total
Year ended June 30, 1923.....	471,070,493	218,622	471,289,115
Year ended June 30, 1924.....	481,729,567	429,231	482,158,798
Year ended June 30, 1925.....	454,036,811	4,171,585	458,208,396

REVENUE RIDES ON DETROIT MUNICIPAL LINES

Year	Population	Rail Lines	Coach Lines	Together	Revenue Rides per Capita of Population per Annum
1923.....	1,219,275	357,386,437	218,622	357,605,059	293
1924.....	1,310,169	367,120,260	429,231	367,549,491	281
1925.....	1,401,064	338,155,230	4,171,585	342,326,815	244

STATISTICS OF DETROIT MUNICIPAL LINES FOR THE YEAR ENDED JUNE 30, 1925,
COMPARED WITH THE YEAR ENDED JUNE 30, 1924

Statistics	Year Ended June 30, 1925	Year Ended June 30, 1924
Railway revenue car-miles.....	48,300,107	50,401,902
Coach revenue coach-miles.....	1,218,307	85,492
Railway revenue car-hours.....	5,252,021	5,653,643
Railway revenue passengers.....	338,155,230	367,120,260
Railway transfer passengers.....	115,881,581	114,609,307
Railway total passengers.....	454,036,811	481,729,567
Coach revenue passengers.....	4,171,585	429,231
Total passengers.....	458,208,396	482,158,798
Railway operating revenue per car-mile, cents.....	44.02	44.75
Coach operating revenue per coach-mile, cents.....	24.44	27.36
Railway operating expenses per car-mile, cents.....	31.60	32.43
Coach operating expenses per coach-mile, cents.....	24.64	28.03
Railway operating revenue per car-hour.....	\$4.05	\$4.00
Railway operating expenses per car-hour.....	\$2.90	\$2.89
Ratio of transfer passengers to revenue passengers—Railway, per cent.....	34.27	31.21
Railway revenue passengers per car-mile operated.....	7.00	7.27
Railway transfer passengers per car-mile operated.....	2.40	2.27
Total railway passengers per car-mile operated.....	9.40	9.54
Coach revenue passengers per coach-mile operated.....	3.42	5.02
Ratio of railway operating expenses to railway operating revenue, per cent.....	71.77	72.46
Ratio of coach operating expenses to coach operating revenue, per cent.....	100.81	102.43

CONDENSED STATEMENT OF INCOME OF DETROIT MUNICIPAL LINES FOR THE PERIOD
FROM JAN. 1, 1924, TO JUNE 30, 1925 (CENTS DISREGARDED)

Revenue	Half Year Ended June 30, 1924	Year Ended June 30, 1925	Together
From transportation.....	\$11,256,127	\$20,956,023	\$32,212,150
From other railway operations.....	250,769	605,803	856,573
Total operating revenues.....	\$11,506,897	\$21,561,826	\$33,068,724
Deduct—Operating expenses.....	7,941,992	15,590,261	23,530,254
Net revenue from operation.....	\$3,564,904	\$5,971,565	\$9,536,469
Deduct—Taxes assignable to railway operations and miscellaneous rents paid.....	357,797	704,467	1,062,265
Balance, operating income.....	3,207,107	5,267,097	8,474,204
Add—Non-operating income.....	62,427	159,479	221,906
Gross income before interest charges, depreciation, etc.....	\$3,269,534	\$5,426,577	\$8,696,111
Deduct—Interest and miscellaneous charges.....	1,051,407	1,995,081	3,046,488
Income before depreciation and loss in inventory value as at June 30, 1925.....	\$2,218,127	\$3,431,495	\$5,649,623
Deduct—Provision for depreciation of property.....	498,890	1,056,293	1,555,183
Income after depreciation but before loss in inventory value as at June 30, 1925.....	\$1,719,236	\$2,375,202	\$4,094,439
Deduct—Loss in value of material and supplies on hand at June 30, 1925, as developed by physical inventory.....			137,944
Net income for the period.....			\$3,956,494

STATEMENT OF DISPOSITION OF INCOME OF DETROIT MUNICIPAL LINES

Revenue	Half Year Ended June 30, 1924	Year Ended June 30, 1925	Together
Income for the period after provision for depreciation but before deducting loss in inventory value at June 30, 1925, as above.....	\$1,719,236	\$2,375,202	\$4,094,439
Deduct—Sinking fund and other appropriation in excess of provision for depreciation:			
Sinking fund provisions for payment of funded debt and purchase obligations—			
For construction bonds (exhibit IX).....	\$283,327	\$571,351	\$854,679
For purchase bonds (exhibit X).....	65,953	133,000	198,953
For additions and betterments bonds (exhibit XI).....	4,109	50,000	54,109
For purchase contract—			
On semi-annual installments (exhibit XII).....	497,267	918,885	1,416,152
On final payment (exhibit XII).....	392,143	786,441	1,178,584
Appropriation of income to equipment purchase fund reserve.....		311,791	311,791
Together.....	\$1,242,801	\$2,771,469	\$4,014,271
Deduct—Provision for depreciation of property.....	498,890	1,056,293	1,555,183
Excess of sinking fund and other appropriations from income over provision for depreciation.....	\$743,911	\$1,715,176	\$2,459,087
Income for the period before deducting loss in inventory value, less sinking fund and other appropriations (in which is included provision for depreciation) as at June 30, 1925.....	\$975,325	\$660,026	\$1,635,351
Deduct—Loss developed upon determination of value of physical inventory of material and supplies on hand as of June 30, 1925.....			137,944
Amount transferred to surplus (exhibit D).....			\$1,497,407

created by monthly charges against earnings of amounts equivalent to 3 per cent of the passenger revenue to provide for the settlement of claims against the department arising from accidents. On this point the report says:

Larger percentages of income are being set aside for this purpose in most cities in which the operating conditions might be considered to be fairly comparable with the conditions in Detroit. However, it is the established practice of the department to charge against the reserve only the payments made in settlement of claims and to charge directly into operating expenses all expenses of conducting the claims division, including hospital and medical charges, workmen's compensation, payments, legal and court expenses, etc.

With reference to the adequacy of this reserve of \$1,383,379, information obtained from the claims division indicates the reserve is more than 100 per cent in excess of the indicated requirements at that date.

While up to June 30, 1925, it was not the practice of the department to set aside funds for the specific purpose of liquidating claims for injuries and damages, the basis of accounting has now been changed in this respect and appropriations of cash are now being made for the purpose of liquidating liabilities of this nature.

The total insurance and surety coverage carried by the department on June 30, 1925, was \$12,463,800.

PASSENGER REVENUE

During the period covered by this examination, the following rates of fare were effective:

Street Car Service.—Cash fare of 6 cents or nine tickets for 50 cents and 1 cent additional for transfers to other street car service.

Motor Coach Service.—“Belle Isle” Service—Cash fare of 5 cents without transfer privilege. “Lynch Road” Service—Cash fare of 6 cents or nine tickets for 50 cents and 1 cent additional for transfers to street car service.

(Note—This motor coach service was replaced by street car service during the period under review).

Other services.—Cash fare of 10 cents with free transfer privilege only on such street car lines as were fed directly by motor coach service. For the privilege of making an additional transfer on the street cars, a further charge of 1 cent was made. Upon presentation of a transfer from street car service, an additional charge of 4 cents was made for motor coach service, making a total fare of 10 cents for street cars and coach service.

The balance sheet as of June 30, 1925, records total assets of \$50,722,915. This sum includes \$42,586,337 as property account invested in road and equipment; total investments of \$5,366,435; working assets of \$1,478,531; total current assets of \$1,149,493, and total deferred charges to future operations of \$142,117. The liabilities include total funded debt and purchase money obligations of \$34,131,000; total current liabilities of \$5,006,804; reserve for injuries and damages amounting to \$1,383,379, and reserve for depreciation of property of \$3,087,484. The total surplus and reserves amounted to \$7,114,246.

Personal Items

Changes in East St. Louis

Messrs. Welsh, Gregory and Rearden
Advanced Before W. H. Sawyer's
Departure for Australia

In line with the proposed departure of W. H. Sawyer, president of the East St. Louis & Suburban Railway, East St. Louis, Ill., to Australia for the purpose of making an electrical survey, personnel promotions have been announced which are at the same time a recognition of men's services and worth. G. W. Welsh has been elected vice-president of the East St. Louis Railway, the East St. Louis & Suburban Railway and the St. Louis & Belleville Electric Railway; T. W. Gregory has been elected vice-president and assistant secretary and Col. Frank L. Rearden



G. W. Welsh

has been elected assistant treasurer of the same lines.

Before his recent promotion Mr. Welsh was assistant to the president of all the railway properties in the group. He was appointed to this position in August, 1924. Ten years before that he had become connected with the East St. Louis & Suburban group of properties in East St. Louis as superintendent of power. He continued in that position until 1919 when he was made chief engineer. Mr. Welsh received his education at Lehigh University where he was graduated with the degree of electrical engineer in 1901. In that year he became identified with the General Electric Company in the testing department, specializing in electric railway work up to 1905. For the next four years he was employed with the New York Central Railroad in connection with the electrification of the Grand Central Terminal in New York City. This electrification job led to another and we next find him with the Southern Pacific Company, San Francisco, Cal., working on the electrification of its suburban lines on the eastern side of San Francisco Bay in Oakland and Berkeley. His title here was assistant electrical engineer. After four years of this work he went with the East St. Louis properties.

T. W. Gregory, the other new vice-president, entered the service of the East St. Louis properties as bookkeeper on July 1, 1902, and four months later was elected assistant secretary and assistant treasurer of the various companies then comprising the system and was elected to a similar office with other companies acquired after that date. Back in 1887 Mr. Gregory, a native of Pomona, Ill., entered the service of the Mobile & Ohio Railroad at Mill Creek, Ill., as telegraph operator. He was employed in that capacity and as station agent at various points on that line between East St. Louis and Cairo until he went to the East St. Louis freight office in 1890 and to the East St. Louis & Suburban Railway and affiliated companies in 1902. With the exception of a period of less than six months in 1892 with the Louisville, New Orleans & Texas at Greenville, Miss., now the Yazoo & Mississippi Valley, his employment for 38 years has been with two interests. On Dec. 22, 1925, Mr. Gregory was appointed receiver of the Alton, Granite & St. Louis Traction Company and on Dec. 31, 1925, was appointed receiver of the Alton Gas & Electric Company.

Col. F. L. Rearden, the new assistant treasurer, was formerly the auditor of the companies.

Mr. Sawyer, president of the railway companies in the East St. Louis group, expects to sail on Feb. 2 in company with H. W. Eales, St. Louis, to make a survey of electric power resources in the Antipodes. Reference was made to this proposed undertaking in the *ELECTRIC RAILWAY JOURNAL*, issue of Jan. 9, 1926, page 90.

E. C. Hathaway Resigns from Inspection Company

E. C. Hathaway, chairman of the board of directors of the Railway Audit & Inspection Company, Inc., Philadelphia, has disposed of his interests in the company and will no longer be associated with it. Mr. Hathaway was formerly president of the company. He is well known among electric railway men. For some time prior to 1916 he was assistant general manager of the Virginia Railway & Power Company, Richmond, Va., in charge of the properties of the company in Norfolk. He served with that company more than fifteen years. Before that he was with the Railways & Light Company of America, with headquarters in Baltimore. This company controlled the public utility properties located in Norfolk, Knoxville, Lexington and other cities.

The Railway Audit & Inspection Company was organized by Mr. Hathaway about 1906, and grew steadily from that time until in 1916 he felt that its conduct demanded his undivided attention. He has a number of important interests other than this and it is understood that he will in the future devote his time largely to them.

A. L. Reynolds in Florida

Washington-Virginia Railway Receiver
With Miami Road Under Elec-
tric Bond & Share

Arthur L. Reynolds has been made superintendent of railways and motor coach operation of the Miami Beach Railway, Miami, Fla., which also holds a management contract with the city for operation of its cars and buses. Mr. Reynolds is thus placed in charge of the entire transportation system of Miami and the line to Miami Beach. Twenty new cars and 24 buses have recently been added to these properties to care for its rapid growth due to the recent Florida popularity. The Miami Beach Railway is owned by the Florida Power & Light Company, controlled through stock ownership by the American Power & Light Company and is under the Electric Bond & Share Company supervision.

Mr. Reynolds was formerly general manager for the Washington-Virginia Railway and since its receivership has



A. L. Reynolds

been receiver as well. He will continue as receiver of that property. Before he went to Washington Mr. Reynolds was manager of the Youngstown & Suburban Railway, Youngstown, Ohio, under the management of Day & Zimmermann, a position to which he was appointed in March, 1921.

Mr. Reynolds began his railway career in the operating department of the Northern Ohio Traction, Light & Power Company in 1907. The following year he took a position as a salesman with the B. F. Goodrich Company, and after remaining with that concern for a year again took up railway work with the operating department of the Twin City Rapid Transit Company as supervisor of transportation. Before the entrance of the United States into the war in 1917 Mr. Reynolds went to the Second Officers' Training Camp at Fort Snelling, Minn. He received a commission as first lieutenant in the infantry.

Upon his return to civil life in 1918 he re-entered the service of the Twin City Rapid Transit Company, Minneapolis. During the latter part of 1918 he conducted for the company many public meetings in connection with its campaign to explain to the people the cost-of-service franchise which the company was seeking to obtain from the city. This

measure was defeated at that time owing to the peculiar political situation, but the matter has since been settled along somewhat similar lines.

In 1919 Mr. Reynolds was again transferred to the St. Paul Division of the Twin City Rapid Transit Company, and while with that company he acted as supervisor of three of the heaviest interurban lines between St. Paul and Minneapolis and also in various other capacities.

Mr. Reynolds was born in 1886 in Ashland, Ohio. He received his education in the grade schools of Akron, Ohio, and later attended Kenyon Military Academy at Gambier, Ohio. He is a graduate of Kenyon College, also in Gambier.

J. W. Nicholson Succeeds Mr. Becht at Cincinnati

The resignation of A. J. Becht, secretary of the Cincinnati Street Railway, Cincinnati, Ohio, for more than fifteen years, has been accepted. Miss M. A.



J. W. Nicholson

Cannon, assistant secretary, also has resigned. The action was in accordance with Mr. Becht's request at the time the railway took over its property from the Cincinnati Traction Company on Nov. 1 last year that he be permitted to retire as secretary on Jan. 1, 1926. He explained that he desired to devote all of his time to his other business and personal interests.

Following the acceptance of the resignations the board elected Joseph W. Nicholson secretary and Miss Caroline Hein as assistant secretary. Mr. Nicholson started with the Ohio Traction Company in 1911 as a stenographer. The Ohio Traction Company owned the Cincinnati Traction Company at that time. In 1920 Mr. Nicholson was made secretary of the Ohio Traction Company, succeeding Walter A. Draper, who then became vice-president. In 1922 he was elected secretary of the Cincinnati Traction Company in recognition of talent which he was quick to display and now succeeds Mr. Becht as secretary of the Cincinnati Street Railway.

Mr. Becht will devote himself to the interest of the Kilgour-Cunningham estate. He is an officer of the Toledo, Bowling Green & Southern Traction Company and of the Cincinnati & Hamilton Traction Company.

A. W. McClimont President

A. W. McClimont, for the past eight years vice-president and general manager of the Winnipeg Electric Company, Winnipeg, Man., has been elected president of the corporation, succeeding George W. Allen, K.C.

W. R. Bawlf of Winnipeg has been elected vice-president. W. H. Carter of Winnipeg and James B. Woodyat of Montreal have been elected directors.

Mr. McClimont, it is understood, will continue to hold the position of general manager.

Rumors About Mr. Dunbar Denied

Emphatic denial has been made by official circles in Philadelphia Rapid Transit Company affairs that W. C. Dunbar has resigned as president as stated in a signed article in a Philadelphia morning newspaper a few days ago. Furthermore it was officially stated the officers of the company resented the inference that President Dunbar welcomed the transfer to Detroit. It was made known at the time Mr. Dunbar went to Detroit he was loaned to Dillon, Read & Company, New York, to help straighten out the situation on the Detroit United Railway. In recent years Dillon, Read & Company have financed both the Philadelphia Rapid Transit and the Detroit United and Mr. Dunbar's selection to assist at Detroit was merely a reflection of the appreciation on the part of the bankers of his experience and abilities.

Frank W. Funk Succeeds

C. I. Crippen at Youngstown

After an absence of several years Frank W. Funk has returned to the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, as assistant to General Manager MacCalla. In this capacity the former associate of C. I. Crippen on the Pennsylvania-Ohio System succeeds Mr. Crippen, who has left the organization to assume the executive supervision of a group of utilities that center in the Pennsylvania Gas & Electric Corporation. Mr. Crippen's new connection was referred to in the *ELECTRIC RAILWAY JOURNAL* issue of Dec. 12, 1925, page 1056.

Mr. Funk entered the service of the Pennsylvania-Ohio Electric System early in 1914 as electrical engineer in charge of operation and construction. After three years in that position he was appointed resident engineer of the Republic Engineers, Inc., and two years later, with the man whom he now succeeds, formed the consulting engineering firm of Crippen & Funk. He has continued in general industrial and consulting engineering work since that time.

Mr. Funk entered the Ohio State University, taking the course in electrical engineering. After he was graduated in 1908 he went direct to the West Penn Power Company on construction work at Connellsville, near Scottdale, Pa., the place of his birth. He remained there six months, when he joined the development staff of the Westinghouse Electric & Manufacturing Company. He continued with the Westinghouse for

about four years, having a part in many important electrical development jobs. Among these was control work in connection with the electrification of the Pennsylvania Railroad terminal at New York, and electrification work on the New York, New Haven & Hartford Railroad.

In 1912 he turned to the public utility field to become assistant electrical engineer of the Northern Ohio Traction & Light Company at Akron. Here he took part in the work of designing and constructing the Gorge power station and other important projects. Later he was made assistant superintendent of motive power in charge of all electrical operation and maintenance and was assistant in steam operation.

H. M. Atkinson Most Valuable Citizen of Atlanta

Henry Morrell Atkinson, chairman of the board of directors of the Georgia Railway & Power Company, contributed in the past twelve months more of in-



H. M. Atkinson

spired, effective and unselfish work for the betterment of the community of Atlanta, Ga., than any other citizen. To him will be awarded the silver loving cup given annually by the *Georgian and Sunday American* for playing the rôle of Atlanta's most valuable citizen in 1925. The committee's selection, according to the announcement, was based on Mr. Atkinson's activities in industrial development of the North Georgia region, of which Atlanta is the center, through great water-power plans, two of which were completed in 1925 and another projected. His efforts to improve transportation facilities in and around Atlanta and his general record of service for the communities and regional development were also cited by the committee.

Mr. Atkinson has been identified with nearly all the important electrical projects that have been put through at Atlanta for more than 25 years and has contributed much to the city's growth and prosperity. He was instrumental in consolidating the railways and lighting companies of Atlanta into the Georgia Railway & Electric Company. He also organized the Georgia Railway & Power Company, which began operating in 1912, and became chairman of the board of directors of that company at the time of its organization. This

position he has held up to the present time. In addition to electrical enterprises he organized, built and was the first president of the Atlanta, Birmingham & Atlantic Railroad, a steam property, which has contributed to the development and prosperity of those sections of Georgia and Alabama served by it. Mr. Atkinson has also found time to take an active interest in the cultural and social life of the community.

E. K. Miles Assistant Superintendent at Syracuse

F. R. Latta has resigned as assistant to the general superintendent of the Syracuse lines of the New York State Railways, Syracuse, N. Y. His resignation became effective on Jan. 1. E. K. Miles, division superintendent, will succeed to the post of assistant to the general superintendent, J. E. Duffy.

Owing to this change three appointments have been made necessary. John Flood, formerly an inspector at Warren and Fayette Streets, becomes division superintendent at the Tallman Street yards. E. F. Wombles, station master at Wolf Street, becomes inspector in place of Mr. Flood, and J. E. Whalen, formerly an outside man at Wolf Street, becomes station master.

Dr. W. A. Rigg Heads Interstate Railways

Dr. Walter A. Rigg has been elected president of the Interstate Railways, Camden, N. J., succeeding his father, John A. Rigg, who died on Jan. 2. Dr. Samuel B. Rigg, another son, became a member of the board of directors. Daniel Houseman, vice-president of the Real Estate Title Insurance & Trust Company, was elected vice-president of the Interstate Railways, succeeding Dr. Walter A. Rigg in that office.

The Interstate Railways is not an operating company. It is largely a disbursing agent for the moneys received under the terms of rentals of properties leased by it for operation by others.

H. M. Gould with Dodge Brothers

H. M. Gould, who resigned late last year as assistant general manager of the Department of Street Railways at Detroit, Mich., is now identified with Dodge Brothers, automobile manufacturers of Detroit, Mich. Mr. Gould was one of the first employees to join the Detroit Street Railway Department. He had been engaged on the municipal line since 1920, when he joined the operative personnel as electrical engineer to supervise electrical construction work. At that time the system was under the direction of former Mayor James Couzens. He was made assistant general manager in the fall of 1924, at which time his career was reviewed in the *ELECTRIC RAILWAY JOURNAL*, issue of Oct. 4, page 574. His promotion at that time was considered a tribute to his grasp of the electric railway problems, which went far beyond his technical training as an electrical engineer. Before going to Detroit he was with the Connecticut Company.

C. E. Newcomer Manager at Phoenix

Charles E. Newcomer, connected for several years with the Phoenix Railway, Phoenix, Ariz., will serve the city as chief clerk of the municipal transportation lines. The position of general manager, held for many years by Sam H. Mitchell, was abolished early in December when it became definitely known that the city would assume operation and control of the lines. City Manager Rieger stated that the City Commission was in full accord with the decision, made in the interest of economy, and that several of the members felt that the salary paid to Mr. Mitchell as general manager is exorbitant in the case of a concern which was sold "lock, stock and barrel" for \$20,000.

Obituary

E. V. Goble

Ernest V. Goble, superintendent of the schedule department of the Grand Rapids Railway, Grand Rapids, Mich., died on Dec. 28 at St. Mary's hospital after an operation. Mr. Goble became connected with the Grand Rapids Railway in April, 1924, as head of its schedule department. He was well known throughout the Middle West in railway circles. His railway training was received in Minneapolis, where he had been employed by the Twin City Rapid Transit Company for many years. He had come up through the ranks from platform man. Mr. Goble was 37 years old last Christmas.

A. W. Jones

Arthur Winslow Jones, manager of the Far East department of the International General Electric Company since its formation in 1919 and a member of the advisory committee of the company, died at Schenectady, N. Y., on Dec. 26. Mr. Jones had general direction over activities of the company in Japan, China, Australia, South Africa, India, Philippine Islands and Dutch East Indies. Previous to the formation of the International General Electric Company in 1919, he was a director on the boards of different foreign selling companies. In 1888 he entered the employ of the Thomson-Houston Company in Lynn, Mass., and in 1891 was made chief engineer of the International Thomson-Houston Company.

Frank E. Chapin

Frank E. Chapin, general manager of the Peninsular Railway, San Jose, Cal., for the past twenty-two years, died on Jan. 5 at the Southern Pacific Hospital, San Francisco. He entered railway work in 1874 with the old Market Street Railway system in San Francisco. Removing to Stanislaus County he was employed by the La Grange Hydraulic Ditch Mining Company for four years and when he went back he joined the California Street Railroad in 1870 as a conductor and also as a gripman. Later he was made starter and then assistant superintendent. This

office he held from 1882 to 1904. In 1904 he went to San Jose as general manager of the San Jose & Los Gatos Interurban Railroad. This road was merged with the Peninsular Railway and then the company purchased all the city lines of San Jose and incorporated them under the name of the San Jose Railroad.

Mr. Chapin's advice on railway operating and engineering problems was sought by railroad men not only within the limits of California but throughout the country. He was born in Tuolumne County, California, 69 years ago.

Joel Hurt, Sr.

Joel Hurt, Sr., pioneer electric railway operator, capitalist and business man at Atlanta, Ga., died at his home there on Jan. 10. He played a prominent part in the rebuilding of Atlanta after the civil war. In 1894-95 he was president of the American Electric Railway Association.

One of the first successfully operated electric railways in the world was built by Mr. Hurt in 1889, running from Inman Park to Atlanta. His planning and development of the suburban sections of Inman Park and Druid Hills were two of his many contributions to the improved living facilities of the Atlantans. He consolidated the city's street railways and in 1901 sold them to interests that later chartered the Georgia Railway & Electric Company.

His activities of the '90s were concerned with the organization of the Trust Company of Georgia, the presidency of which he held for eleven years. In 1892 he built the Equitable Building, the first fireproof office structure in the South.

Mr. Hurt was born at Olivet, Ala., July 31, 1850. After the war he worked his way through college, and took an engineering degree at the University of Georgia in 1871. For the next four years he was engaged in railroad construction and then entered real estate and insurance in Atlanta. His labors thereafter touched nearly every form of the development of the city of Atlanta.

Ralph D. Hood

Ralph D. Hood, vice-president and general manager of the Massachusetts Northeastern Street Railway and the Dover, Somersworth & Rochester Street Railway, died at the Hale Hospital in Haverhill, Mass., on Jan. 9, after an operation following pneumonia. He was one of the most widely-known electric railway men in the Northeast and was universally esteemed in New England traction circles.

Mr. Hood was president of the New England Street Railway Club for the year 1923-1924. He was a native of Massachusetts. He was educated in the public school and at Phillips-Andover Academy and was an engineer by profession. He served as rodman in the Haverhill City Engineer's office in 1891. Next he became transit man for the Haverhill & Amesbury Street Railway, serving that company in 1892 and 1893. He was engineer for the Haverhill, Georgetown & Danvers Street Railway in 1894-1895 and then in turn served in a similar capacity with the Exeter Street Railway, 1897; Ex-

ter, Hampton & Amesbury, 1899-1900; Massachusetts Construction Company and Lowell System, 1900-1903; Manchester & Haverhill Street Railway, 1904.

In 1905 he was office engineer for the El Paso & Durango Railroad and in 1906 engineer of the Rockingham race-track. He was with the Manchester &erry Street Railway in 1907 and the Dover, Somersworth & Rochester Street railway and allied companies from 1908 to 1911. On Jan. 1, 1911, Mr. Good became superintendent of highways for the city of Haverhill and on Jan. 1, 1912, was elected a member of the Municipal Council of Haverhill and served as head of Department of Streets in 1913. He became engineer of maintenance of way of the Massachusetts Northeastern Street Railway and allied companies in 1914, continuing as such to 1917, when he was made vice-president and general manager of these companies.

In addition to his public service in 1911-1913, he has been chairman of the Haverhill Board of Survey from 1917 to late. He saw military service as an officer in the National and State Guards from 1904 to 1919, being promoted successively from Second Lieutenant to Major.

William G. Busby, former chairman of the Missouri Public Service Commission, died at his home in Kansas City, Mo., on Jan. 4. He had been ill for nine months. His death followed a third stroke of paralysis. When the Missouri Public Service Commission was created, in 1911, Gov. Elliott W. Major named Mr. Busby to the commission. Later he was elected chairman and held that post six years. Mr. Busby served as State Senator from 1908 until 1913. He was formerly Mayor of Carrollton, Mo.

William Brownlee Albright, a director of the Sherwin-Williams Company, Cleveland, Ohio, died suddenly on Dec. 28, while visiting in Cleveland. Mr. Albright had been closely associated in both a business and personal way with most of the railroad officials in New York City, and numbered among his friends many of the most prominent railroad men in the United States. He started with the Sherwin-Williams Company in January, 1885. Mr. Albright was born in Philadelphia on July 17, 1855. For the past twenty-five years he has made his home in New York.

Joshua B. Lascell, at one time superintendent of the Charlotte line at Rochester, N. Y., died recently. When the railroad was built from Charlotte to the Ridge Road in 1889 he was made assistant superintendent and later became superintendent, which position he held until the road was merged with the Rochester lines. Mr. Lascell continued with the line until last August, when he retired. He was born 70 years ago in Niagara County, New York.

Benjamin Hudson Ryder, electrical engineer of the American Steel & Wire Company for the past 24 years, died suddenly on Dec. 26. He was widely known in the electrical and railroad circles of the country. Mr. Ryder was born in Hudson, N. Y., on Dec. 3, 1877.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Brisk Foreign Interest in American Equipment

Representatives of National Pneumatic Company, Recently Returned from Abroad, Very Optimistic

Experience of the National Pneumatic Company in developing foreign business indicates a broadening opportunity for American car equipment manufacturers. In the various countries of the Far East, continental Europe and in England interest is growing in the improvement of electric railway cars and in the application of modern American devices.

T. W. Casey, vice-president, and P. R. Foreman, general manager and chief engineer of the National Pneumatic Company, have recently returned after an extended foreign trip. Mr. Foreman visited Japan and continued west from that point until he joined forces with Mr. Casey in Paris, after the latter had proceeded east to England and continental Europe.

Foreign railways were found very much interested in the improvement of car equipment and in the application of pneumatic door control.

In Japan Mr. Foreman completed arrangements under which National Pneumatic devices will be manufactured in that country by the Mitsubishi Denki K. K. under National Pneumatic patents. Negotiations are now under way with the Imperial Government Railways and other lines in Japan looking to the installation of pneumatic door control apparatus.

In France the Chemin de Paris-Orleans, which has begun the electrification of its lines, is putting into service a sample installation of pneumatic door equipment. The cars are equipped with folding doors and are arranged for the interchange of passengers at platforms of different levels. Consideration is being given to the matter of equipping 120 cars with pneumatic door control.

An order for 50 car sets of pneumatic engines and control has been received for Bucharest in Rumania. These are for street car service and the design arrangement closely follows American door control practice.

In Berlin the Nord Sud subway cars are initiating the installation of pneumatic doors by equipping eight cars. These doors will be of the sliding type. The decision was dictated by the desire to increase speed and safety while at the same time reducing train operating costs. The Hochbahngesellschaft is watching the Nord Sud installation carefully from the standpoint of its own operating conditions.

Installation of pneumatic door control has made considerable progress in Spain. On the surface lines in Barcelona 62 cars of the center-entrance type have been in service with pneumatic door equipment for a period of approxi-

mately two years. Experience with these cars has been so satisfactory that future equipment will probably be of this type. The question of remodeling some of the older cars is being considered in comparison with the advantages of new equipment.

Preparations are being made to open the first section of the new Barcelona subway. Cars for this service are being completed. They closely follow modern American practice and incorporate full pneumatic door equipment for the operation of twelve sliding doors per car, six on each side.

Interest in rehabilitation and improved equipment is also reported in England and London. The London Underground has in service a large number of pneumatically equipped cars. The London United Tramways, Ltd., has three cars in service equipped with automatic rear exit treadles.

Ohio Brass Holds Annual Sales Meeting

Field forces of the Ohio Brass Company gathered at Mansfield, Ohio, on Jan. 11 for their annual sales conference, which extended through the week. A daily program of meetings was held at the Mansfield plant up to Thursday night. Friday and Saturday were spent at the insulator plant in Barberton.

A careful analysis of Ohio Brass products is one of the features of these meetings. In addition to the discussion of marketing problems, the field men are brought into contact with factory development and manufacturing plans. As the company has grown and its products have become more diversified these annual meetings have been the means of maintaining that close contact between factory and salesman which is one of the features of Ohio Brass Service.

Charles Gordon, assistant vice-president of the McGraw-Hill Company, took part in the program by presenting a series of charts showing the application of modern industrial marketing principles to the sale of electric railway equipment.

American Bus and Truck Plans

R. D. Scott, vice-president of the Chemical National Bank, New York, has been named treasurer of the newly organized American Bus & Truck Company, which recently purchased the Kelly-Springfield Motor Truck Company, Springfield, Ohio. This announcement was made by H. W. Torney, New York engineer connected with the company, who was in Springfield with C. C. Jamieson, chairman of the company board, for an inspection of the plant. Philip Diehl, Springfield, has been named assistant treasurer. The other officers are yet to be chosen.

The board of directors of the new company is composed of Mr. Jamieson, New York manufacturer; H. E. Freeman, president of the American Trust & Savings Bank, Springfield; Mr. Scott; Walter Kutzleb of the banking firm of Morgan, Livermore & Company, New York, and Mr. Torney.

The same sales branches of the former Kelly-Springfield company will be used by the new concern, which plans, in addition to other lines, to manufacture a complete line of buses on foreign patents.

New Cable for Detroit City Service

The Public Service Production Company, a subsidiary of the Public Service Corporation of New Jersey, is installing about 360,000 ft. of underground cable for the Detroit municipal light and street railway services. The contract was let by the Habirshaw Cable & Wire Company.

Car Building and Motor Merger

New Company Planned to Control Brill and American Car & Foundry Motors Company—Merger Plan Expected to Be Declared Operative Soon

THE J. G. Brill Company, Philadelphia, Pa., is one of the principal figures in a combination of transportation equipment builders announced on Jan. 13 by Samuel M. Curwen, president. It involves companies having total assets of \$150,000,000 and outstanding capital stock issues of nearly \$75,000,000, with the American Car & Foundry Company of New Jersey the dominating factor through its acquisition of more than a majority of the voting stock of the new Brill corporation.

Mr. Curwen was active with William H. Woodin, president of the American Car & Foundry Company of New Jersey, in arranging the deal. In a letter to stockholders of the Brill company Mr. Curwen says:

The object of the plan and reorganization, so far as the stockholders of the J. G. Brill Company are concerned therein, is to afford them opportunity to share in the advantages of a large and growing business conducted in conjunction with their present car business under co-operative management.

Based upon appraisals of properties and audit of accounts, and if there shall be acquired by it the entire capital stock of the J. G. Brill Company, the Brill Corporation upon completion of its organization, will be possessed of assets representing a value of approximately \$20,000,000, and the Brill Corporation will have a source of earnings for its stock equal to its share as a stockholder of both American Car & Foundry Motors Company and the J. G. Brill Company, in the combined earnings of the above described engine and bus companies and the J. G. Brill Company, which share in such combined earnings, based on past experience of said companies and continuance of present conditions, is estimated to amount to more than \$2,150,000 per annum.

Under the name of the Brill Corporation, or some similar designation preserving the name Brill, a new corporation will be organized in Delaware to take over a majority of the outstanding stocks of the Brill company and the American Car & Foundry Motors Company, a Delaware corporation organized in December, 1925.

Appointments Made by International G. E.

A. S. Durant, formerly manager of the department of the Americas, has been made a vice-president of the International General Electric Company, in charge of commercial relations and with headquarters in New York City.

James C. Ryan, formerly sales manager of the department of the Far East, has been appointed general sales manager with responsibility for all sales of apparatus and supplies.

E. A. Baldwin, formerly manager of the department of Europe, has been appointed manager of the Schenectady office, with general supervision of the Schenectady office and responsibility for engineering and contract relations.

W. J. Edmonds, comptroller of the company, with headquarters in New York, in addition to his former duties, now has executive direction of the activities, with the exception of sales effort, of the International foreign sales companies.

of the Class A shares of the new corporation as may be necessary, will provide the funds required for the purposes of the merger plan and addition working capital.

The American Car & Foundry Company will receive \$1,500,000 in cash and all of the Class B shares of the new corporation not required for the purposes of exchange for stock of the Brill company. Class B shares alone have voting rights.

New Foreign Representative for American Foreign Sales Corporation

Charles R. Cullen, formerly manager for the west coast of South America for the Baldwin Locomotive Works, has joined the American Foreign Sales Corporation, 150 Broadway, New York City. Announcement of the formation of this organization appeared in the ELECTRIC RAILWAY JOURNAL for Oct. 24. Mr. Cullen will represent the company's interests in Peru, Bolivia, Chile and the Argentine, with offices in Lima, La Paz, Santiago and Buenos Aires.

In 1917 Mr. Cullen had charge of construction work in Brazil for E. J. Lavino Company, manganese shippers, later returning to this company and accepting a position with the Baldwin Locomotive Works. This resulted in his returning to South America in the latter part of 1919 to open offices for the Baldwin company in Peru and Chile.

Mr. Cullen was graduated from Cornell University, class of 1908, with the degree of mechanical engineer. After graduation, he joined the American Locomotive Company as a special apprentice, employed at both the Schenectady and Dunkirk plants until 1911, when he went with R. W. Hunt & Company, inspecting engineers, for a year. He then returned to the American Locomotive Company as a traveling engineer and commercial representative for the foreign sales department. While employed in this capacity, Mr. Cullen's field was very widespread, in Brazil, Colombia, Central America, Serbia, Bulgaria and Greece. He is a member of the American Society of Mechanical Engineers and is highly regarded in both foreign and domestic engineering circles.

Legislative Safeguards for Stability of Metal Prices Sought

Legislation will be sought during the present session of Congress to make it possible for American consumers of tin and other mineral commodities to pool their buying. It seems certain that the sub-committee of the interstate and foreign committee of the House of Representatives that will have charge of an investigation in this field will be urged to recommend such action on the part of the government.

In the case of tin, it is believed by some of the non-ferrous specialists in the government service, who expect to be called before the committee, that this step would constitute an important safeguard for the industry. Should the largest two American consumers—the United States Steel Corporation and the National Lead Company—have legal authority to join in their purchases of tin, they alone could do much

The latter corporation owns all the capital stock of the Hall-Scott Motor Car Company, California, and more than 90 per cent of the capital stock of the Fageol Motors Company, Ohio. The American Car & Foundry Company of New Jersey will own a majority of the voting stock of the new corporation.

More than 60 per cent of the common and preferred stocks of the Brill company have already been deposited under the plan. The plan provides that the new organization shall have 7 per cent cumulative preferred stock of about \$4,000,000, par \$100; 225,000 shares of no par Class A stock and 400,000 shares of Class B stock.

There are outstanding 48,102 shares of Brill common stock, a majority of which is held by Brill estates, and 45,800 shares of preferred stock. Holders of these shares can exchange them on the following basis:

Preferred stock: One and one-tenth shares of 7 per cent cumulative preferred stock of the new corporation, or \$110 in cash, for each share held.

Common stock: One share of the 7 per cent cumulative preferred stock and one share of the Class B stock of the new corporation, or two shares of the Class A and one share of the Class B stock of the new corporation, or \$125 in cash for each share held.

Last recorded sales of Brill common were at \$136 a share and the preferred at \$105.50.

Under the plan, the new company will acquire more than 50 per cent of the preferred and approximately 67 per cent of the common stock outstanding of the American Car & Foundry Motors Company, including all the stock owned or controlled by the American Car & Foundry Company of New Jersey. The latter concern, by the purchase or underwriting of such amount

insure against price inflation, it is bid.

While the production of Brazilian tin under American control, Nigerian tin, under British control, is necessary to its efficacious smelting. It will not be contended that there has been any agrant manipulation of tin by the British, but it will doubtless be pointed out that they are in a position to bring about price advances if they should decide to do so. This is an ever-present possibility, with the success of rubber control dangling before British eyes.

\$6,000,000 Proposed for Extensions in San Francisco

Mayor James Rolph of San Francisco, Cal., recommended to the new Board of Supervisors the expenditure of \$6,000,000 for 25 miles of new street car lines and 8 miles of bus lines during the year. If this work is carried forward it will mean a considerable extension of present operations, for the municipal railway system as now constituted comprises 69 miles of track and 14 miles of bus routes.

More Business Booked by General Electric

Orders received by the General Electric Company for the year ended Dec. 31, 1925, amounted to \$302,513,380. Compared with \$282,107,697 for the year 1924, this was an increase of 7 per cent. For the three months ended Dec. 31, 1925, orders totaled \$78,636,669, compared with \$80,009,978 for the same quarter of 1924, a decrease of 2 per cent.

Tool Steel Company Is Optimistic

From the standpoint of orders received, 1925 was a record breaker for the Tool Steel Gear & Pinion Company, Cincinnati, Ohio. A considerable amount of heavy traction electrification business came to the company from abroad, practically all of these orders hailing from electrifications where the manufacturer supplied the gears in 1914-1916. Incidentally, the foreign shipments are pretty well spread about the face of the globe, as shown by the following orders:

Equipments	
New South Wales Government Railway	150
Netherlands State Railway, Utrecht, Holland	100
London, Midland & Scottish Railway	96
Havana Central Railroad Company, Havana, Cuba	32
São Paulo Tramway, Light & Power Company, São Paulo, Brazil	80

In the first three cases the gears weighed from 500 to 700 lb. each.

During the year two steel gears were specified on a total of 588 new motors which were bought for the street railway lines at Altoona, Atlanta, Scranton, Gary, Denver, Rochester, and Toledo. Basing their predictions on the trend of conditions during the past few months, the Tool Steel officials are convinced that the current year holds excellent prospects for the industry.

Many Reports of Impending Car Purchases

Reports that persist in trade circles indicate that many important car purchases impend. The JOURNAL has not heard all of the reports by any means, but when in a single week rumors are on tap of the probable purchase of about 400 cars the matter deserves more attention than would be accorded to it if the purchases that are said to be impending were listed as separate items of news. Here are some of the rumors arranged on an ascending scale: Five cars for Chattanooga, ten for Nashville, ten for Evansville, 30 for Little Rock, 30 for Memphis, 75 for New Orleans, 100 for Philadelphia and 100 for Detroit. This is an imposing total, both in number of cars and in the amount of \$3,600,000 estimated to be involved in their purchase.

The Chattanooga, Nashville and Evansville properties are controlled by the Hodenpyl-Hardy interests. So far as it was possible to learn, no direct appropriation has been authorized covering these expenditures. The other Southern properties reported about ready to consider the purchase of cars are all under Electric Bond & Share supervision. Confirmation of this report could not be obtained, but judging from the progress that is being made industrially and in a civic way in each of these places it would appear likely that additions to equipment would follow. A somewhat similar situation appears to exist with respect to Detroit. No cars to the extent of the impending indicated order have been purchased and no bids have been asked recently. There is an equipment purchase program under way, but H. U. Wallace, general manager of the Department of

Street Railways, says the program has not been definitely decided. No order has been placed by the Philadelphia Rapid Transit Company for 100 new cars. That is definite. However, the company has before it the problem of caring for the crowds expected to attend the Sesqui-Centennial and it has already worked out its plans for track extensions into the grounds and details of similar traffic arrangements. It may be that these plans as finally concluded will embrace a program that will include among its items a provision for the addition of new rolling stock to the extent of the requirement previously indicated.

Prospects ahead in electric locomotive construction appear to be particularly good. Not only do inquiries for equipment indicate this, but it is confirmed by the electrification projects for 1926 actually outlined. One of the large manufacturing companies handling this type of equipment now has inquiries for 75 or 80 electric locomotives. This may or may not represent the total of such inquiries from all sources, but it does represent a probable expenditure of \$50,000,000. If all this work materializes the total will be in striking contrast with 1925, when 47 locomotives were reported to have been ordered at a cost of about \$20,000,000.

\$900,000 to Be Spent in Akron

Nearly \$2,500,000 will be spent during 1926 for improvements in territory served by the Northern Ohio Traction & Light Company, Akron, Ohio. The tentative 1926 budget provides for the expenditure of approximately \$900,000 in the street railway and interurban department, including the purchase of twenty new buses, ten of which will be

ELECTRIC RAILWAY MATERIAL PRICES—Jan. 12, 1926

Metals—New York		Paints, Putty and Glass—New York	
Copper, electrolytic, cents per lb.	14.15	Linseed oil (5 bbl. lots), cents per lb.*	11.9
Lead, cents per lb.	9.25	White lead in oil (100 lb. keg), cents per lb.	15.5
Nickel, cents per lb.	35.00	Turpentine (bbl. lots), per gal.	\$1.115
Zinc, cents per lb.	8.85	Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Tin, Straits, cents per lb.	63.00	Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Aluminum, 98 to 99 per cent, cents per lb.	27.00	Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Babbitt metal, warehouse, cents per lb.		Putty, 100 lb. tins, cents per lb.	4-6
Commercial grade	56.00	* Prices f.o.b. works, boxing charges extra.	
General service	31.50	Wire—New York	
Bituminous Coal		Copper wire base, cents per lb.	16.00
Smokeless mine run, f.n.b. vessel, Hampton Roads	\$4.875	Rubber-covered wire, No. 14, per 1,000 ft.	\$7.00
Somerset mine run, Boston	2.075	Weatherproof wire base, cents per lb.	18.25
Pittsburgh mine run, Pittsburgh	2.05	Paving Materials	
Franklin, Ill., screenings, Chicago	1.875	Paving stone, granite, 5 in.	
Central, Ill., screenings, Chicago	1.425	New York—Grade 1, per thousand	\$147
Kansas screenings, Kansas City	2.375	Wood block paving 3½, 16 lb. treatment, N. Y., per sq. yd.	\$2.70
Track Materials—Pittsburgh		Paving brick 3½x8½x4, N. Y., per 1,000 in earload lots	51.00
Standard steel rails, gross ton	\$43.00	Paving brick 3½x8½x4 N.Y., per 1,000 in earload lots	45.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2.95	Crushed stone, ½-in., earload lots, N. Y., per cu. yd.	1.85
Tie plates (flat type), cents per lb.	2.425	Cement, Chicago consumers' net prices, without bags	2.10
Angle bars, cents per lb.	2.75	Gravel, ½-in., cu. yd., f.o.b. N. Y.	1.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.075	Sand, cu. yd., f.o.b. N. Y.	1.00
Steel bars, cents per lb.	2.00	Old Metals—New York and Chicago	
Ties, white oak, Chicago, 6 in.x8 in.x8 ft.	\$1.35	Heavy copper, cents per lb.	11.75
Hardware—Pittsburgh		Light copper, cents per lb.	9.75
Wire nails, base per keg	2.65	Heavy brass, cents per lb.	7.25
Sheet iron (28 gage), cents per lb.	3.35	Zinc, old scrap, cents per lb.	5.125
Sheet iron, galvanized (28 gage), cents per lb.	4.60	Lead, cents per lb. (heavy)	8.00
Galvanized barbed wire, cents per lb.	3.35	Steel car axles, Chicago, net ton	\$17.75
Galvanized wire, ordinary, cents per lb.	2.50	Cast iron car wheels, Chicago, gross ton	18.25
Waste—New York		Rails (short), Chicago, gross ton	18.75
Waste, wool, cents per lb.	12-18	Rails, (relaying), Chicago, gross ton	25.50
Waste, cotton (100 lb. bale), cents per lb.		Machine turnings, Chicago, gross ton	9.50
White	13-17.50		
Colored	10-14		

*The method of selling linseed oil on a gallon basis has been changed and all sellers now quote on a pound basis.

double-deck carriers. A new freight depot will be built in North Howard Street and cars purchased for the freight traffic. An addition will be built to the South Akron substation at a cost of \$350,000.

What Is the Life of a Paving Brick?

An important investigation is being conducted by the United States Bureau of Public Roads to ascertain the durability of a vitrified paving brick wearing surface. On a circular track located at the bureau's experimental farm at Arlington, Va., ten sections of vitrified brick paving have been laid out, the only variable being found in the depth (or thickness) of the brick. This ranges from 2 in. to 4 in., being graded in increases of $\frac{1}{2}$ in.

The object is to determine the intensity and weight of traffic that can be withstood by the various depths of the vitrified brick wearing surface. To this end artificial impact is being introduced and every attention given to subjecting the brick wearing surface by means of intensified traffic to the same sort of punishment and in the same or greater degree that it would get under normal use in a public street or highway. The need for this test became apparent through the increasingly greater use of thinner brick by highway engineers throughout the country. It was considered advisable to ascertain as definitely as possible through such a test just what traffic the various thicknesses of brick can be expected to withstand.

Electric Train for the Erie

A gasoline-electric train intended for the Erie Railroad is now under construction by the J. G. Brill Company, Philadelphia. It consists of a combination motor and baggage car and three day coaches. The new equipment will be placed in service around the middle of January on the Jefferson branch, near Carbondale, Pa. This will be the first gas-electric train to be commercialized in that section.

Rolling Stock

Montreal Tramways, Montreal, (Que.) Canada, has awarded a contract to the Canadian Car & Foundry Company, Ltd., for the construction of 50 new cars. The value of the contract is approximately \$900,000. It is said that delivery will commence in the spring.

Tampa Electric Company, Tampa, Fla., received on Dec. 28, 1925, seven new cars which were referred to in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 12, 1925, page 1060. The details follow:

Builder of car body.....	American Car Company
Type of car.....	Semi-convertible motor passenger
Seating capacity	52
Total weight	32,500
Booster centers, length.....	23 ft. 9 in.
Length over all	45 ft. 4 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 3 in.
Body	Steel
Interior trim	Light mahogany
Roof	Arch
Air brakes.....	Westinghouse variable load
Armature bearings	Plain

Axles	A. E. R. E. A. standard
Bumpers	3-in. channel
Car signal system.....	Faraday high voltage
Car trimmings	Bronze
Center and side bearings.....	Brill
Compressors	Westinghouse DH-16
Control	K-35-KK
Couplers	None
Curtain fixtures	Curtain Supply Company
Curtain material	Pantasote
Destination signs	Hunter
Door-operating mechanism.....	Westinghouse
Exterior finish	Enamel
Fare boxes	Johnson
Fenders or wheelguards	H-B
Gears and pinions	Nuttall
Hand brakes	American Car Company
Headlights	Golden Glow SM-95
Journal bearings	Plain
Journal boxes	Brill
Lightning arresters	Westinghouse K-3
Motors	Westinghouse No. 510, inside hung
Registers	International R-10
Sanders	American Car Company
Sash fixtures	O. M. Edwards
Seats	Waylo
Seating material	Pantasote
Slack adjuster	American
Springs	Brill
Step treads	Feralun
Trolley catchers	Ideal
Trolley base	Ohio Brass
Trucks	Brill 77-E
Ventilators	Utility
Wheels	26-in. cast iron
Special devices, etc.....	Nichols-Lintern traffic light

Indianapolis Street Railway, Indianapolis, Ind., overhauled and remodeled 75 cars in the company's shops during 1925. The program for the new year calls for remodeling 100 street cars so that they can be operated by one man when desired.

Track and Line

Sioux City Service Company, Sioux, City, Ia., will spend about \$150,000 on the construction of four major improvements during 1926. Financing for this work was made possible by the recent granting of a 25-year franchise to the company. The work planned is: A turnout will be constructed on upper Jackson Street between Thirty-fourth Street and Thirty-fifth Street. Elimination of the traffic menace at the Peters Park intersection will be accomplished by a curve and cross-over which will be constructed near the intersection of Transit Avenue and Morningside Avenue. The waiting room at this intersection will be abandoned, which will open Transit Avenue to vehicular traffic. A new line, probably double track, will be constructed on Sixth Street from Pierce Street to Jones Street, thus forming a new loop for the downtown district. New track will be laid on Eleventh Street from Court Street to Wall Street.

British Columbia Electric Railway, Vancouver, B. C., it is reported will spend \$200,000 in double-tracking in 1926. Most of the money will be expended in Point Grey.

Portland Electric Power Company, Portland, Ore., in its budget for 1926 calls for an expenditure of approximately \$3,200,070. In the railway department the city lines' estimate is \$550,000 and the interurban lines' estimate \$320,000.

Indianapolis Street Railway, Indianapolis, Ind., included in its track projects of 1925 an additional track of approximately 3,700 ft. and 4,500 ft. of track in East Tenth Street. In Central Avenue 4,030 ft. of single track was replaced and in Pennsylvania Street,

4,000 ft. of single track was replaced and an additional 1,000 ft. laid to provide double-track facilities. Renewal were made at practically every one of the downtown intersections. The company used 1,500 tons of steel, 38,000 ties, 670,000 paving bricks and 60,000 paving stones. In connection with this work, 5,600 rail joints were welded by the thermit process.

Trade Notes

E. C. Folsom has been appointed receiver for the Railway Materials Company, Toledo, Ohio, by an order of the United States District Court at Toledo. Notice has been mailed to creditors of the company requesting them to file claims promptly in order that the assets may be quickly and economically liquidated.

J. G. Brill Company, Philadelphia, Pa., announces the appointment of F. O. Paul as service manager of its automotive car division. For several years Mr. Paul was connected with the sales and service departments of the Timken Roller Bearing Company, Canton, Ohio. He was previously affiliated with the International Motor Company as chief inspector at its New Brunswick, N. J., plant. His experience in automotive affairs covers a period of more than fifteen years.

Morton Manufacturing Company, Chicago, Ill., has purchased property adjacent to its present Chicago plant, on which it is planning the construction of an addition which will provide 50,000 sq. ft. of extra shop space.

L. S. Belding has joined the Electric Service Supplies Company, Philadelphia. He is a graduate of Pratt Institute, Department of Science and Technology, later attending the H. L. Doherty School at Toledo. After leaving the army Mr. Belding was connected with the Albany Felt Company as factory engineer, and as factory and service engineer for the Consolidated Car Heating Company. Later he acted as sales engineer for the latter company. Mr. Belding will cover Ohio and part of Michigan for Electric Service Supplies Company.

New Advertising Literature

General Electric Company, Schenectady, N. Y., has issued Bulletin GEA-295, entitled "Automatic Switching Equipment." It is well illustrated and describes the application of this equipment to railway service, hydro-electric generators, mining and industrial service, central station service, etc.

Topping Brothers, New York, distributors for Bearium Bearings, Inc., Buffalo, N. Y., have issued a leaflet setting forth the outstanding advantages of these bearing metals for all types of industrial requirements. Five grades of metal are specified, each adapted for certain types of work. Among the merits claimed for Bearium products are the overcoming of porosity, ease of machining, non-scoring of shafts or journals under faulty lubrication conditions, longer service and greater strength.

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Co-ordinating Motor Transport, Railroad and City
Plans, Service, Routing, Valuation, Economic Studies
EXPERIENCE IN 20 CITIES

Transmission Line and Special Crossing Structures, Catenary Bridges

WRITE FOR OUR NEW DESCRIPTIVE CATALOG

ARCHBOLD-BRADY CO.

Engineers and Contractors

SYRACUSE, N. Y.

"Opportunity"

Advertising:

Think "Searchlight" First!

0096

KELKER, DELEUW & CO.

CONSULTING ENGINEERS

REPORTS ON

Public Relations

Rates

Operating Problems

111 W. Washington Street, Chicago, Ill.

JOE R. ONG

Consulting Transportation Engineer

*Specializing in Traffic Problems and in Methods to
Improve Service and Increase
Efficiency of Operation*

PIQUA, OHIO

Big Results from Little Ads

The advertisements in the Searchlight Section are constantly bringing together those who buy, sell, rent or exchange.

They convert idle commodities into useful cash, idle cash into useful commodities, and that which you have but don't want into that which you want but don't have.

The cost is a trifle, the results considerable.

0059

Get Your Wants into the Searchlight

C. B. BUCHANAN
President

W. H. PRICE, JR.
Sec'y-Treas.

JOHN F. LAYNG
Vice-President

BUCHANAN & LAYNG CORPORATION

*Engineering and Management, Construction,
Financial Reports, Traffic Surveys
and Equipment Maintenance*

BALTIMORE
825 Equitable Bldg.

Phone:
Hanover 2142

NEW YORK
49 Wall Street

THE P. EDWARD WISH SERVICE

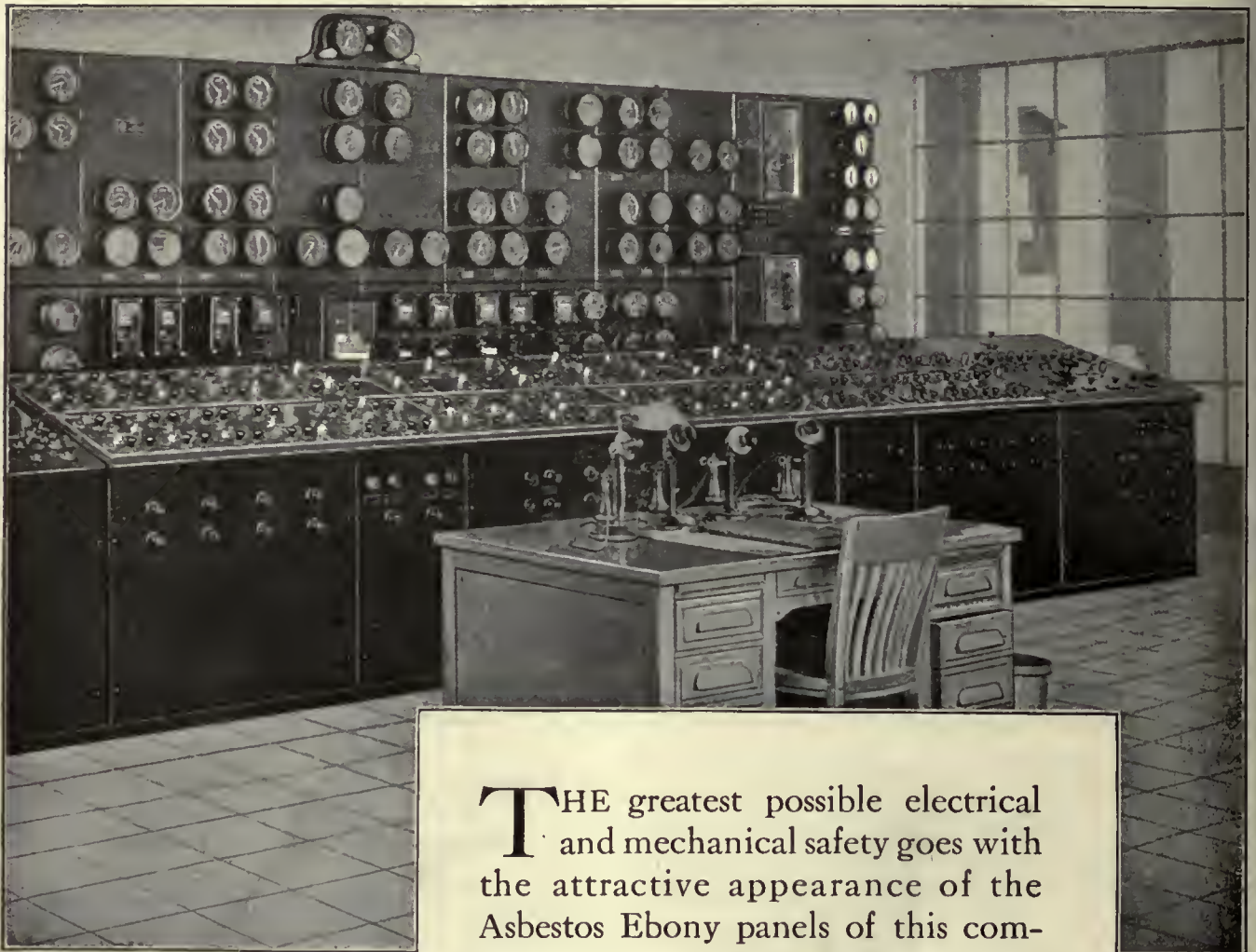
50 Church St.
NEW YORK

Street Railway Inspection
DETECTIVES

131 State St.
BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

Asbestos Ebony Panels



*Installation by the
Bureau of Power
and Light, Los
Angeles, Calif.*

THE greatest possible electrical and mechanical safety goes with the attractive appearance of the Asbestos Ebony panels of this combined switch and bench board of the Bureau of Power and Light, Los Angeles, Cal.

Asbestos Ebony surpasses all other switchboard materials in dielectric strength, physical resistance, and workability.

JOHNS-MANVILLE Inc.

292 Madison Avenue, at 41st Street, New York City

Branches in 64 Large Cities

FOR CANADA: CANADIAN JOHNS-MANVILLE Co., Ltd., Toronto



JOHNS-MANVILLE



The Canadian Pacific Railway Chooses the Fageol Safety Coach

After a minute and careful engineering investigation of the entire motor bus field, the Canadian Pacific Railway Company chose Fageol Safety Coaches to equip its new bus operating subsidiary, the Canadian Pacific Transport Company, Ltd.

They bought on the basis of established and demonstrated facts—superior earning power, through greater passenger appeal, and lower “last costs.”

FAGEOL
SAFETY COACH

Territory West of the Rocky Mountains served by
Fageol Motors Company
Hollywood Blvd. at 107th Ave.,
Oakland, California

Territory East of the Rocky Mountains served by
The Fageol Company
(In the Akron District)
Kent, Ohio



In the service of the Middlesex & Boston St. Ry., White Buses **LEECE-NEVILLE EQUIPPED**

Passengers riding home from work appreciate a good steady reading light in the buses. Operation on a regular schedule, with cost per bus-mile shaved down to a profitable minimum, demands the use of thoroughly reliable electrical equipment.

These two basic requirements of an electrical system for bus service are fully met by LEECE-NEVILLE Voltage Regulation,—standard on the White Buses operated by the Middlesex and Boston Street Railway.

Other advantages of this up-to-date system are listed to the right. If you are interested we will gladly send you an interesting booklet discussing the question in full detail. *Write us.*

Note these demonstrated advantages

The battery cannot be over-charged.

The battery is charged only at the correct rate for its condition.

The battery will go longer without refilling with water.

The life of the battery is greatly prolonged.

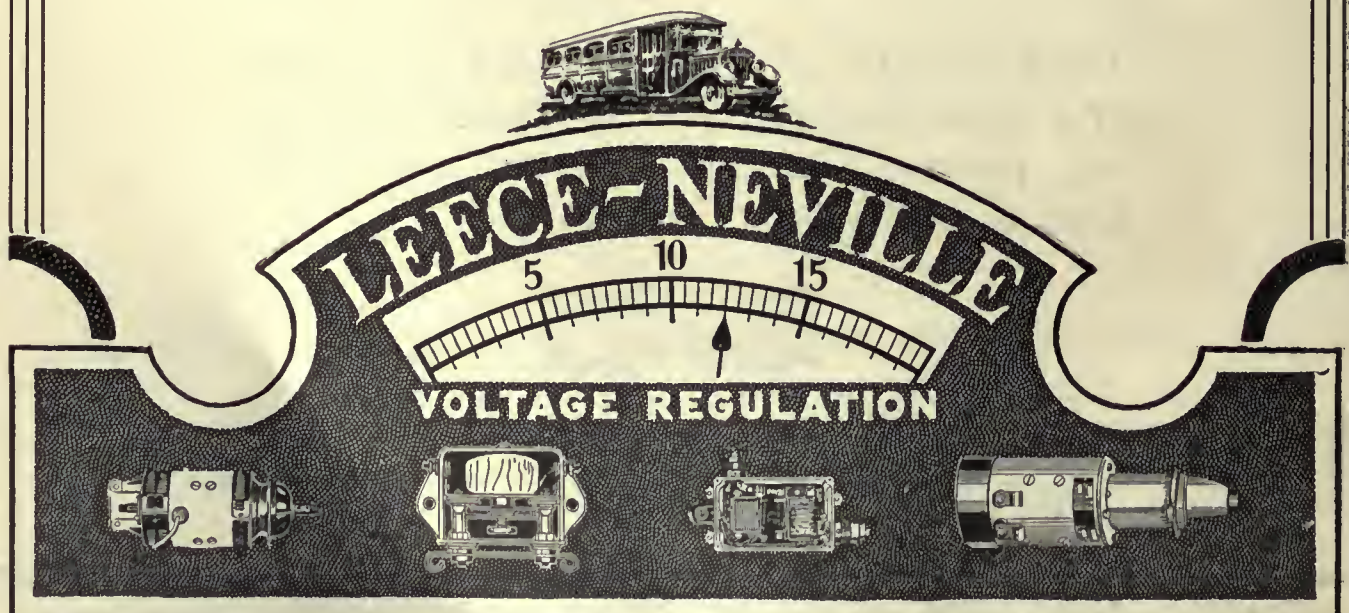
The lights can be operated direct from the generator when the engine is running.

Loose or corroded battery connections will not cause the lamp bulbs to burn out due to a rise in voltage.

It is the most economically operated generating system for motor bus use.

Write for descriptive booklets

THE LEECE-NEVILLE COMPANY
CLEVELAND, OHIO



The GARFORD GREYHOUND

A Fleet, Light Weight Revenue Building Machine

Advanced ideas in bus design and bus transportation practice are expressed by the Garford Greyhound Motor Buses.

Light in weight, well balanced with low center of gravity, gracefully sturdy lines, a quick get-away in traffic and high average speed on inter-city runs, low gasoline consumption, and very reasonable cost of upkeep—all these contribute to the high net earning ability and good-will value of the Greyhound.

In them is the same sound engineering that has made the Garford favorably known, wherever used, for its ability to stay out of the shop and on the road—where it could *earn*.

We will gladly furnish you with full specifications on the Garford Greyhound. See the nearest Garford Dealer or write to Headquarters.



*Garford Pioneered
4-Wheel Brakes
on Motor Buses*

The Garford Motor Truck Company

619 Wapak Road, Lima, Ohio

MOTOR BUSES—17 to 30 PASSENGERS

MODERN CARS for

H. G. Taylor said—

"The rider who in the old days enjoyed his trip on the street car because he knew no better method of transportation has become independent and critical. Old methods, therefore, will necessarily have to be discarded with old conditions. A time-tried and valuable commodity must be put up in a new and attractive package."

Extracts from address of H. G. Taylor, Member Nebraska State Railway Commission, presented at the American Electric Railway Association Convention, Atlantic City, Oct. 8, 1925.

This is the second of a series of advertisements devoted to Modern Cars.

St. Louis Car Company

INTERURBAN AND CITY PASSENGER CARS AND TRUCKS
SELF PROPELLED RAILCARS - BUSES
STEAM RAILROAD COACHES AND FREIGHT CARS
SEATS, CUSHIONS, TRIMMINGS AND GENERAL RAILWAY SUPPLIES
BRONZE, BRASS, GRAY IRON AND MALLEABLE CASTINGS
STEEL FORGINGS

Cable Address
"Car"

St. Louis, Mo., January 11th, 1926

St. Louis, Mo..

EDWIN B. MEISSNER,
PRESIDENT & GENERAL MANAGER

TO THE ELECTRIC RAILWAY INDUSTRY:-
What an illuminating epigram Mr Taylor has used!

"A time-tried and valuable commodity must be put up in a new and attractive package."
The electric railway is indeed the time-tried commodity in the transportation field, and its present need is neatly described as a new and attractive package. To the task of helping the railways to devise and secure this "new and attractive package," the St. Louis Car Company dedicates itself.

We are willing and prepared to do for you, what we have done for other railways—namely to work out with the best-looking, most comfortable and practical modern car, and to assist you in arranging to finance it.
Let's talk it over.

Yours very truly,
Edwin B. Meissner
President & General Manager

EDM/D

Modern Conditions—

Johnstown Traction Co., Johnstown, Penna.

started the New Year by placing in service 10 attractive looking city cars built at the QUALITY SHOP of the St. Louis Car Company. The officials of the traction company justify their belief in a "new and attractive package" by having the exterior of these cars painted blue and white with red upper sash frame; the interior is finished in bright mahogany and the cars are brilliantly lighted, resulting in increased patronage on the part of the traveling public. The St. Louis trucks under the car illustrated are equipped with SKF roller bearings.

Quality Cars



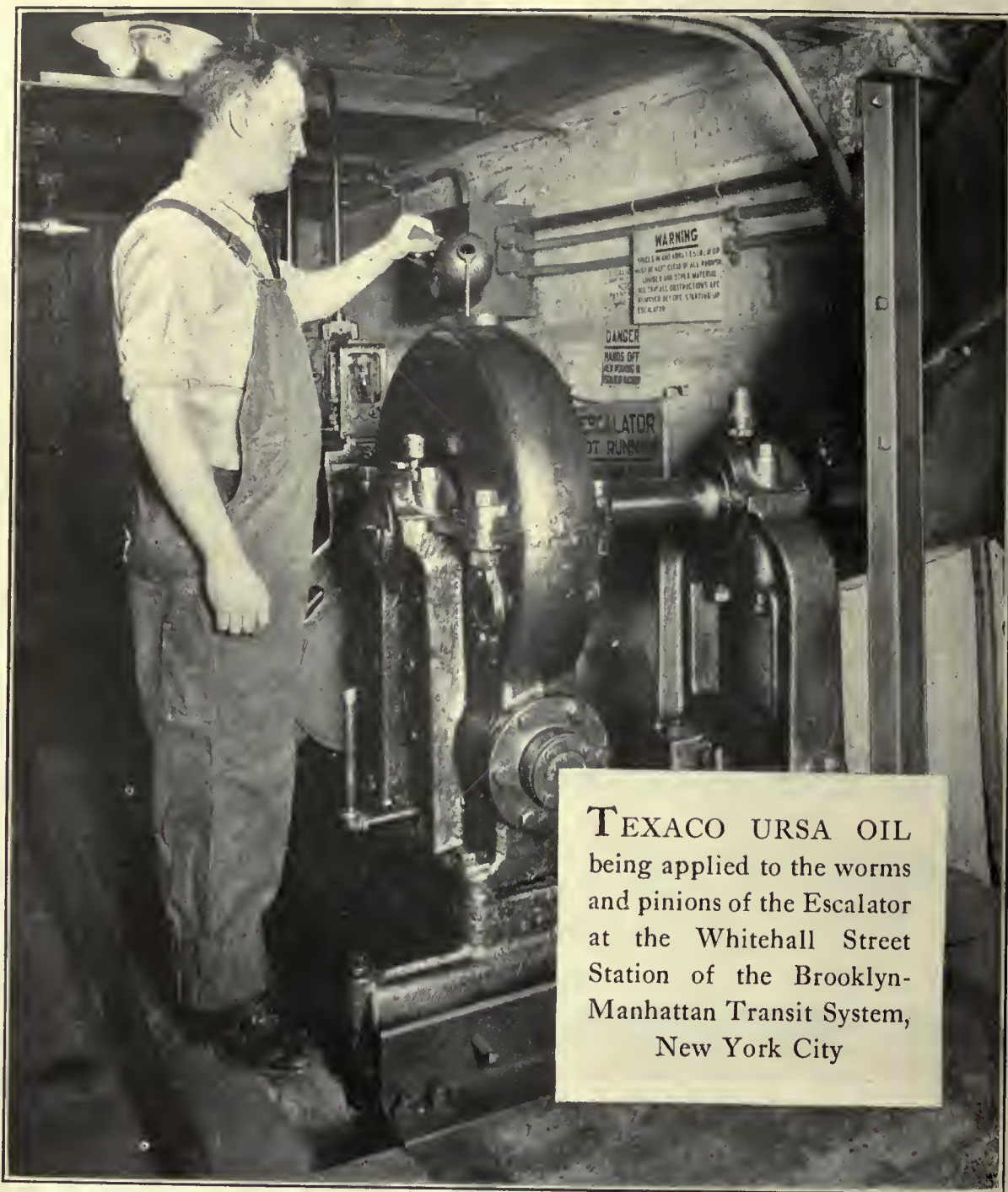
**Ten New Cars Recently Delivered
TO JOHNSTOWN TRACTION CO.
JOHNSTOWN, PENNA.**

by

St. Louis Car Company
St. Louis, Mo.

"The Birthplace of the Safety Car"





TEXACO URSA OIL
being applied to the worms
and pinions of the Escalator
at the Whitehall Street
Station of the Brooklyn-
Manhattan Transit System,
New York City

TEXACO

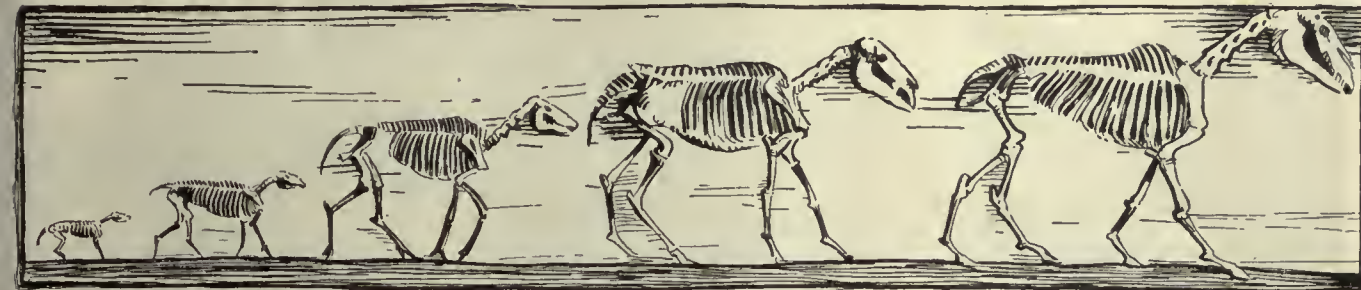


The Chosen Lubricant
of ELECTRIC RAILWAYS



Transportation-The Whole World Around

THIRD SERIES



It took Six Million Years, they say, to develop the horse from the tiny Eohippus, only eleven inches high, to the horse that we know today. But tires improve more rapidly. New manufacturing methods have put India "miles ahead of competition" in a few short years.



The Rickshaws — familiar sights in the Orient—depend for their mileage records on Coolies' non-skid toes. It is hard to improve on Nature for length of service. India Tires won't last a lifetime—but they're mighty callous at that.



The Clovelly Fast Freight —in Cornwall, England, proves that goods may be hauled by any sort of make-shift—even a donkey with a couple of crates on its back. But why not seek the best in transportation? Why not be India-Wise? It costs no more.



The Light Traveling Coach of 1804—with no tires at all—when every pebble registered its own particular jolt. Think of harnessing air and rubber to last 15 or 20 thousand miles or more—and carrying such loads as the days of 1804 never dreamed of. The world "do move"—and a whole lot of it, today, is moving on India Tires.



India Tire and Rubber Co., Akron, Ohio

INDIA TIRES

With the Gum-Weld Cushion



• • and for the Los Angeles Railway Safety Coaches General Cords, of Course!

Sixty - five busses — safety coaches like the one pictured and big, heavy double-deckers — that's the fleet of the Los Angeles Railway, one of the finest in the West.

Naturally, the tires used are the finest and most economical money can buy—husky, long-lived General Cords.

So many large fleet operators are swinging over to Generals! ... to make sure of the lowest possible tire cost per mile.

Riding on less inflation — *and with less internal wear* — Generals absorb the jolts and jars of the road, providing real protection for the mechanism of the bus.

Thanks to their lower rolling-resistance, Generals bring a substantial yearly saving in power and gasoline consumption, assuring the lowest possible cost of operation.

And *that's* what every fleet operator wants.



The

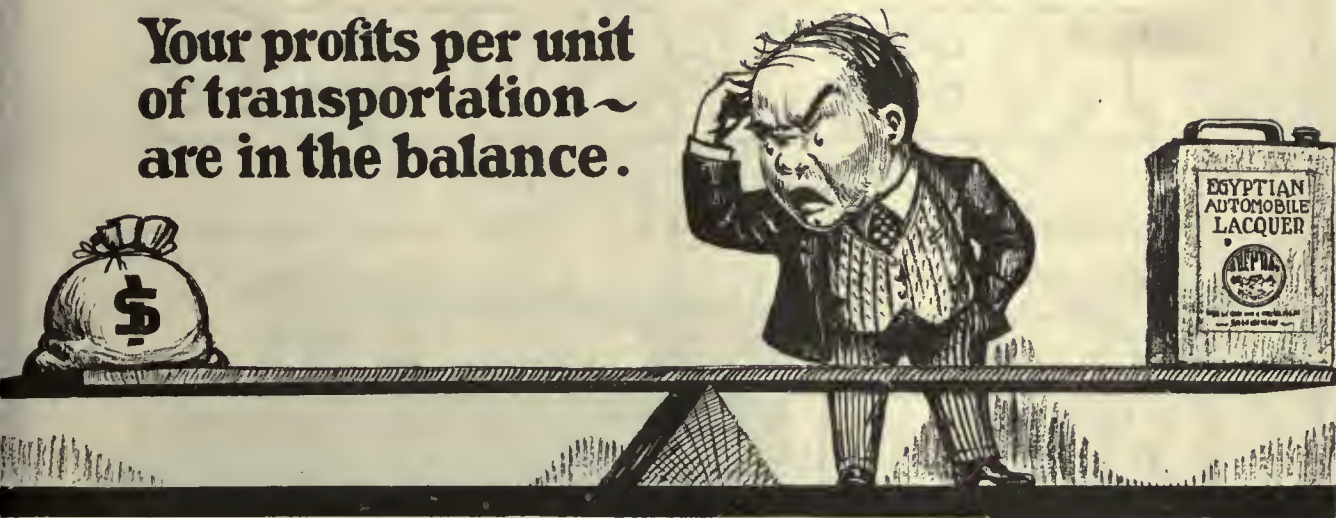
GENERAL CORD

—goes a long way to make friends

BUILT IN AKRON, OHIO, BY THE GENERAL TIRE AND RUBBER CO.

Finish or Refinish

**Your profits per unit
of transportation ~
are in the balance.**



FINISHING new railway cars or refinishing old ones, your profits per unit of transportation are in the balance. It's the attractively finished cars that bring in the business.

But, why use Egyptian Lacquer?

—because its permanent finish keeps your cars out of the shop and “in service.”

—because the ease and speed of application make finishing and refinishing cheaper, not only from labor standpoint but from the shop time standpoint. Successive coats of Egyptian Lacquer may be applied with spray gun in one-hour periods.

—because for fifty years this company has manufactured lacquers exclusively, offering a product based on practical manufacturing experience and research.

Consult us before specifying your next finishing or refinishing job.

The EGYPTIAN LACQUER MFG. CO.

90 West Street, New York

EGYPTIAN LACQUERS

WOLF'S KEMI-SUEDE

The Material of Manifold Uses



A Few of the Many, Many Uses

Street and Railway Cars—

Roofs and Upholstering, Window Packing
and Floor Covering.

Automotive—

Top Coverings, Linings and Upholstery.
Car Curtains and Floor and Running
Board Covering.

Card Tables—

For Top Material.

Seat Covers—

Slip Covers—

Tarpaulins—

Waterproof Blankets—

And many, many other uses.

*Wolf's Kemi-Suede is made in many
pleasing colors; also in many weights*

THE beauty—the soft, velvety texture—the waterproof qualities of Wolf's Kemi-Suede, are taking the manufacturers of street cars, buses and automotive equipment (and maintenance men) off their feet. It's the material everybody has been looking for, but nobody heretofore has been able to get.

Wolf's Kemi-Suede wears and wears and wears—it is guaranteed not to crack, break or check. If it soils, scrub it with plain soap and water—it cleans quickly and easily and all the original beauty is restored. On car roofs, it is *waterproof when applied*; it does NOT require several coats of paint. Used on car seats, it is equally satisfactory.

Wolf's Kemi-Suede No. 1002—a special heavy-weight material, for electric car and bus floors. Not only will outwear linoleum and similar floor coverings, but keeps passengers from slipping. Also unexcelled for window stripping; to keep out cold air, prevent rattles. Recommended also for door jamps.

We are making a grade of Wolf's Kemi-Suede for electric car window curtains. It is clean, sanitary, washes perfectly, and—unlike ordinary curtains—retains its original attractiveness after being washed.



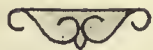
ST. LOUIS OFFICE:
Grayson Railway
Supply Co.,
600-601 LaSalle Bldg.

DETROIT OFFICE:
C. A. Lindsey Co.,
615 Stevens Bldg.

NEW YORK OFFICE:
Sisson Supply Co.,
2 Rector St.

CANADIAN
REPRESENTATIVES:
Lyman Tube and Supply
Co., Ltd., Montreal

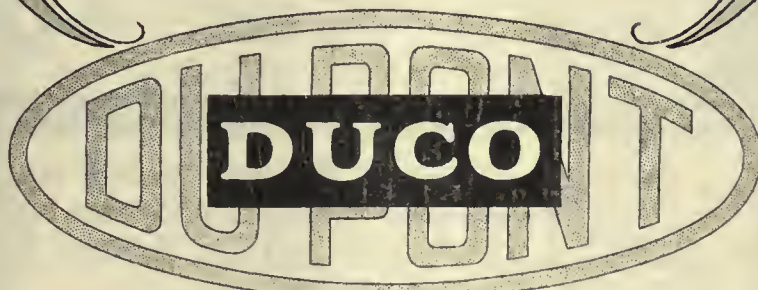
The LEON L. WOLF WATERPROOF FABRIC Co.
519 MAIN ST. Dept. D CINCINNATI, O.



*The efficiency
of DUCO begins
when it cuts the
time of finishing
more than one-half
.... and continues
almost indefinitely.
Those elements
which break down
old fashioned fin-
ishes do not injure
DUCO.*

Du Pont finishing engineers will be glad to furnish further information about DUCO, and estimate the annual savings you can accomplish by using it.

E. I. du Pont de Nemours & Co., Inc., Chemical Products Division, Parlin, N. J., Chicago, San Francisco . . . Canadian Distributors: Flint Paint and Varnish Limited, Toronto, Canada.

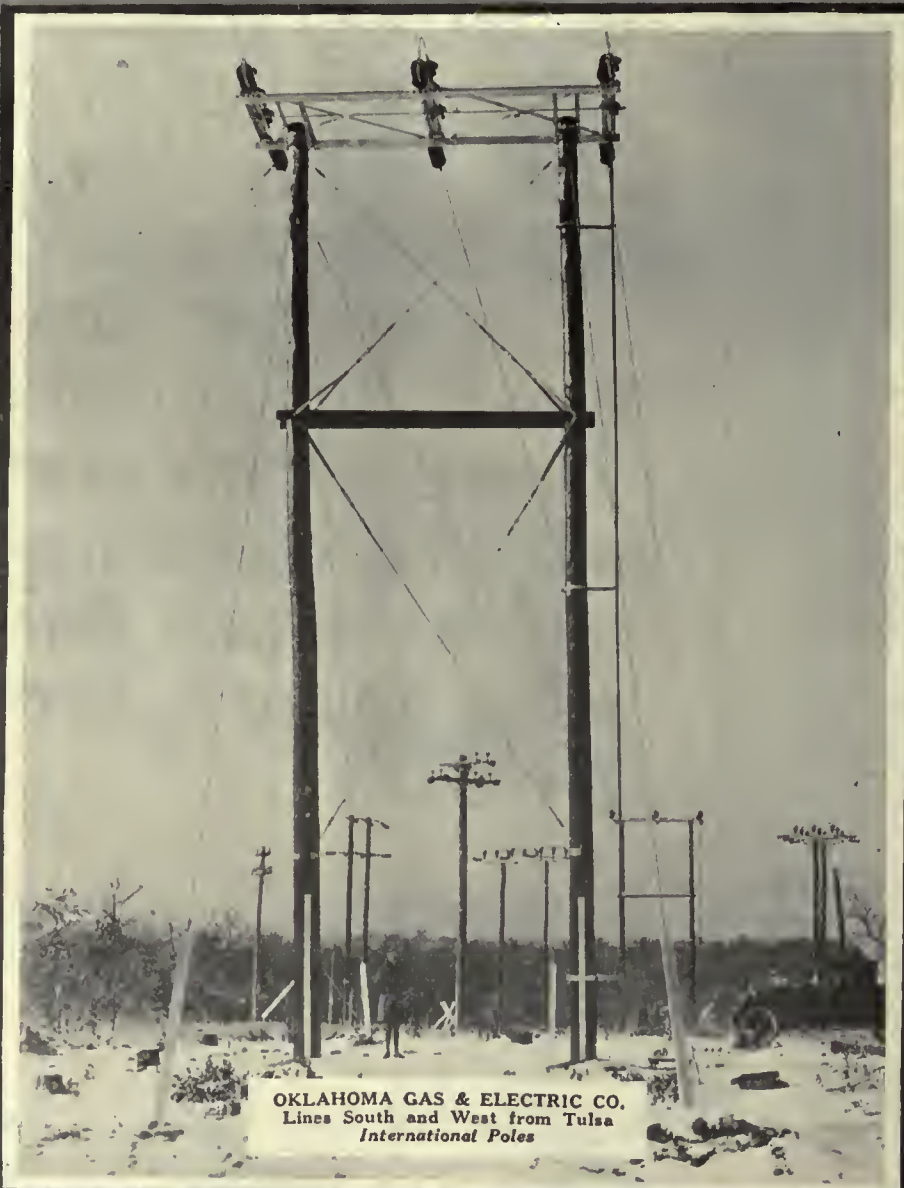


REG. U.S. PAT. OFF.

There is only ONE Duco — DU PONT Duco

International

PRESSURE CREOSOTED
YELLOW PINE POLES



Permanent Strength Protects Against Storm Damages

A REMARKABLE FEATURE of Creosoted Pine Poles is their lasting strength. There is no gradual decrease in strength due to decay. With these poles therefore it is not necessary to build the line with poles larger than actually needed.

The great strength of *International* Creosoted Pine Poles is permanent. That is why they offered the greatest protection against monetary loss and service interruption during last year's ice storms.

International Creosoting & Construction Co.
Galveston—Texarkana—Beaumont

TIMKEN

Tapered

ROLLER BEARINGS



In Trolley Bases



It can be done. A trolley base that will swing free and true forever, without risk of wobble or binding, is made possible by the use of Timken Tapered Roller Bearings.

In the O-B Trolley Base, produced by The Ohio Brass Co., Mansfield, Ohio, Timken Bearings maintain alignment despite weight, shock, and the constantly shifting thrust reaction of the pole. With their greater bearing area per unit of required space, Timkens carry maximum loads

most compactly, which fits this trolley base for heavy duty on electric freight, as well as for smaller passenger cars.

Eliminating excess friction, and permitting perfect enclosure, Timken Bearings in trolley bases make this inaccessible point independent of constant lubrication or other attention.

There are always new examples of the many betterments Timken Bearings produce in any mechanism.

THE TIMKEN ROLLER BEARING
COMPANY, CANTON, OHIO

An Improved Safety Zone



BUILT WITH



PIPE



neat in appearance—easily installed—
readily removed—economical—strong

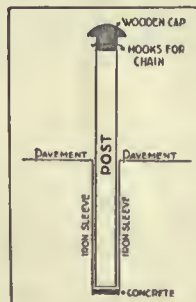
Says The American City Magazine:

A * * * * Safety Zone that can not be violated, is described by the Commissioner of Public Works of the city of Detroit. It consists of a row of extra strong wrought steel poles, six inches in diameter, set into the pavement, eight feet apart, and standing about three and one-half feet above it.

"The zone is five feet wide by eighty-eight feet long, which is the full length of the space where the street cars, including trailers, receive and discharge passengers. To prevent autos from running through the safety zone a post is set close to the car track, and to eliminate any danger of accidents caused by autos running into the posts, a bright green light burns on a tall post at the end. The post which carries this light is offset from the safety zone, so that in case any one should strike the end post with some vehicle heavy enough to bend it, the lamp-post would probably escape injury.

"It is thought that the new type affords as much protection as the concrete safety zone, if not more, and the cost is only a small fraction of the cost of the concrete. The cost of a concrete safety zone of similar size is about \$1,600, while the new type costs slightly less than \$400.

"The posts were set in the following manner: After the pavement was cut through, holes were bored to a depth of slightly more than three feet, and a little concrete was poured into the hole; then a sleeve 3 ft. long and 7 in. in diameter was dropped into it, and more concrete was poured around outside the sleeve. The posts, which are 6 in. in diameter, drop into this outer sleeve, thus being removable at any time, as they are not cemented or otherwise fastened. These hollow posts are 6 ft. long, which makes them extend 3 ft. above the pavement, but each is capped with a wooden plug, rounded, which gives the posts a more finished appearance and also serves to keep water from getting into them. This plug adds nearly 6 in. to the height of the post.



"With this type of safety zone, it is a simple and inexpensive matter to change the location. The lamp-post is bolted to the pavement, but the wiring is attached only by means of a slip connection beneath the base, so it, too, can easily be moved. It is estimated that the whole safety zone could be entirely removed in about one hour."

Send for "NATIONAL" Bulletin No. 1—Characteristics and Advantages of "NATIONAL" Pipe

NATIONAL TUBE COMPANY, PITTSBURGH, PA.
GENERAL SALES OFFICES: FRICK BUILDING

DISTRICT SALES OFFICES

Atlanta Boston Chicago Denver Detroit New Orleans New York Salt Lake City Philadelphia Pittsburgh St. Louis St. Paul
Pacific Coast Representatives: U. S. Steel Products Co. San Francisco Los Angeles Portland Seattle
Export Representatives: U. S. Steel Products Co. New York City

"Today's winners in the endurance contest are—"

Whenever the results of the "wear-and-tear" contest are posted, Boyerized Parts get the first places.

Made to stand the gaff of hard usage, they outlast the average contestant by three to four times.

On your next job pick your railway supplies from the winners shown at the left.

Brake Pins
Brake Hangers
Brake Levers
Pedestal Gibs
Brake Fulcrums
Center Bearings
Side Bearings
Spring Post Bushings
Spring Posts
Bolster and Transom Chafing Plates
Manganese Brake Heads
Manganese Truck Parts
Bushings
Bronze Bearings
McArthur Turnbuckles

We'll gladly quote on your requirements

Bemis Car Truck Company
Electric Railway Supplies
SPRINGFIELD, MASS.

REPRESENTATIVES:

Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 54 First Street, Portland, Ore.
J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 722 Pacific Electric Bldg., Los Angeles, Cal.



"It's Boyerized"



"Boyerize to economize"

Six Years



Troy Pike, Dayton, Ohio, when Dayton Ties were being put in under the southbound track of the Dayton & Troy Electric Railway.

DAY
RESILI

The Dayton Mechanical
DAYTON,

of Traffic

And the track
looks like this!

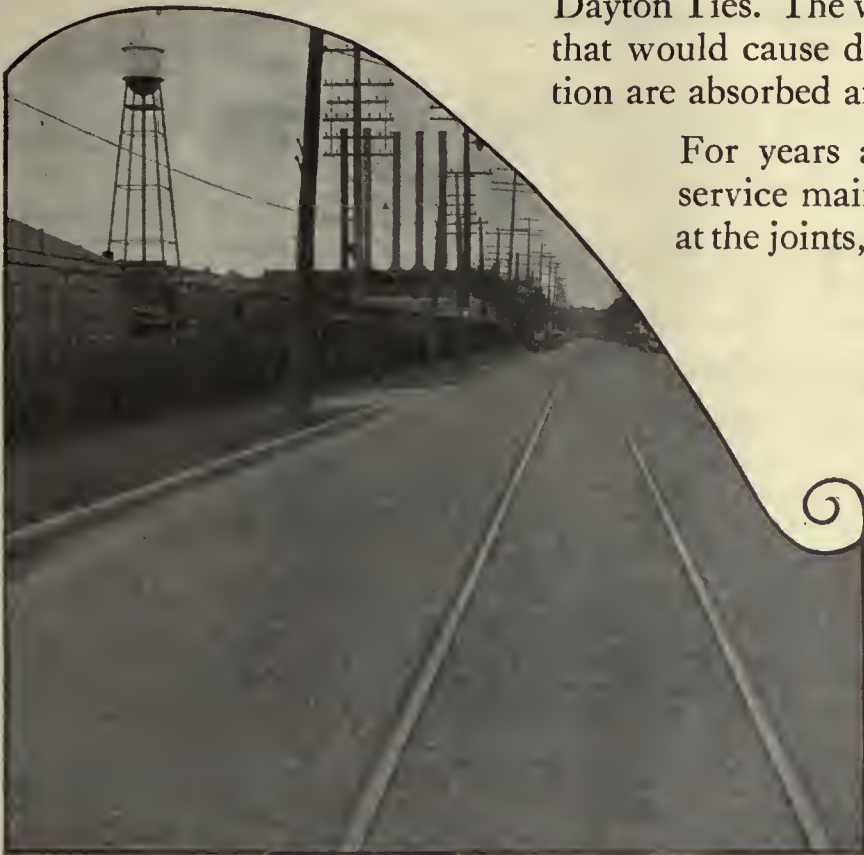
The best testimonial is performance. The condition of Dayton Tie track after years of heavy service under traffic is its best recommendation.

In it can be read the value of the RESILIENT wood block and asphalt cushion construction of Dayton Ties. The vibration and blows of traffic that would cause disintegration of the foundation are absorbed and deadened.

For years and years of smooth, quiet service maintenance is negligible, even at the joints, where trouble usually starts.

Dayton Resilient Ties will save you more money in both installation and maintenance costs than you probably think possible. You owe it to your job to KNOW what they will do.

*Write to us
for details of
construction
and cost data.*



The same track in 1924. Heavy interurban traffic has left no mark upon it. McCook Field, the Army Air Base, is on the left.



Dayton Tie Company ~ ~ ~



Special- ization

THE operating engineer who takes charge of your machinery is undoubtedly a highly skilled man, and fully competent for the work he is expected to do. But why ask him to do something that has not entered into his training?

An operating engineer is not a lubricating engineer. He should not be expected to choose the proper grades of oils and greases for the machinery in his charge.

Lubrication is not a side-line—it is an extensive and very exacting branch of the engineering profession. Many of the lubricating specialists in our employ have been studying lubricating problems for more than ten years, and are still learning. For new problems arise to be solved every day.

We offer you the services of these engineers without charge. They will make a survey of your plant, and will recommend the correct grades of oils and greases for use on each piece of machinery.

Standard Oils and Greases

will, when correctly used, save power, reduce friction and lower depreciation costs. But every piece of machinery has its individual lubrication requirements. An oil or grease that is exactly suited to the requirements of one bearing may cause another to burn out in a few days.

If you want to be sure that the correct grades of lubricants are being used on your equipment, phone or write our nearest branch office and arrange for a survey by our engineers.

STANDARD OIL COMPANY

(Indiana)

General Offices: 910 S. Michigan Avenue

Chicago, Illinois



Over 70 per cent
placed repeat orders
which proves
that "Tool Steel"
gear & pinions are
best by test

read the story


10 years ago our company gave free of charge 58 "Tool Steel" pinions to 58 different electric railway companies, who had not before used our product. They agreed to keep track of the pinions and report to us at intervals as to how they were performing.

After a lapse of 10 years we have checked up and find of the 58 companies, 41 have placed repeat orders with us and have bought a total of 607 gears and 1814 pinions as the result of the test they ran. 17 companies either failed to follow their records or did not place repeat orders. Of these 17—eight are not operating at the present time.

Tool Steel Quality T.S.Q. Tool Steel Quality

**The Tool Steel Gear and Pinion Co.
Cincinnati, Ohio**



Collier Service

A nation-wide
organization
building and
sustaining car
card advertising
space values



Barron G. Collier, Inc.

Candler Bldg.
New York

SHORT SMOOTH STOPS

With

SIMPLEX CLASP BRAKES



REDUCE THESE TROUBLES

Hot Boxes

Train Resistance

Slid-Flat Wheels

Shocks and Hard Riding

Excessive Brake Shoe Wear

SIMPLEX CLASP BRAKES *Eliminate*

Journal Disturbances Which Cause Hot Boxes

Dragging Shoes and Stuck Brakes which cause Heavy Train Resistance and Slid-Flat Wheels.

Heavy Shoe Pressures and Unbalanced Loads on Truck Frames and Truck Springs which cause Hard Riding, Shocks, and High Brake Shoe Maintenance Costs.

AMERICAN STEEL FOUNDRIES

NEW YORK

CHICAGO

ST. LOUIS



Humboldt County
Van Duzen River Bridge
View looking North.



Construction Work—Bridge across
Truckee River and S.P.R.R. tracks lo-
cated in Nevada County, near Polaris.



Bridge over North Fork Pacheco Creek.
Located in Santa Clara County

News from California about Concrete

Field control of concrete quality is now standard practice of the California State Highway Department.

During the last year and a half fifty bridges in various parts of the state have been built strictly in accordance with this practice.

Recognition has been given the principle that the most important factor in obtaining concrete of uniform strength is *control of the water ratio*.

In designing the proper mix for this control, aggregates have been graded by sieve analysis; proportions have been accurately determined by fineness modulus.

Then as a check on the consistency of the concrete, slump tests were made at regular intervals.

Finally, strengths on all jobs were verified by testing field cylinders made of concrete as it came from the mixer.

Results of these tests prove—as similar tests have proved on many other jobs throughout the country—that field control insures uniformly better concrete.

Write today for a copy of "Design and Control of Concrete Mixtures." Address the nearest office listed below. There is no obligation.

PORTLAND CEMENT ASSOCIATION

A National Organization to Improve and Extend the Uses of Concrete

ATLANTA	DALLAS	KANSAS CITY	NEW YORK	SALT LAKE CITY
BIRMINGHAM	DENVER	LOS ANGELES	OKLAHOMA CITY	SAN FRANCISCO
BOSTON	DES MOINES	MILWAUKEE	PARKERSBURG	SEATTLE
CHARLOTTE, N. C.	DETROIT	MINNEAPOLIS	PHILADELPHIA	ST. LOUIS
CHICAGO	INDIANAPOLIS	NASHVILLE	PITTSBURGH	VANCOUVER, B. C.
COLUMBUS	JACKSONVILLE	NEW ORLEANS	PORTLAND, ORE.	WASHINGTON, D. C.

Our Booklets are sent free in the United States, Canada and Cuba only



A GOOD many
“STANDARD”
wheels are in
service on Phila-
delphia Frank-
ford Elevated
Cars.



Rolled Steel Wheels

Quenched and Tempered
Carbon Steel Axles

Coil and Elliptic Springs

STANDARD STEEL WORKS COMPANY

PHILADELPHIA, PA.

BRANCH OFFICES:

CHICAGO
ST. LOUIS
NEW YORK
HOUSTON, TEXAS

PORTLAND, ORE.
RICHMOND, VA.
SAN FRANCISCO
BOSTON

ST. PAUL, MINN.
PITTSBURGH, PA.
LOS ANGELES, CAL.
MEXICO CITY, MEX.

WORKS: BURNHAM, PA.

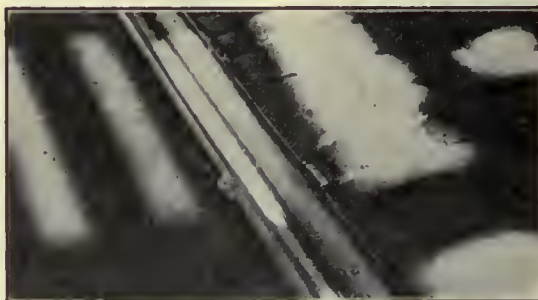
Standardized welding ~

The same successful process since 1912

The history of rail welding in the past ten or fifteen years has been a veritable kaleidoscope of changing ideas. First one process, then another, has been "improved" and hailed as "the last word." Equipment, expensive and cumbersome, is purchased first for one and then for another method, only to be abandoned and scrapped when welds begin to fail and prove the process wrong, thus cluttering up stockrooms with obsolete welding materials.

Thermit, alone, since 1912 has undergone and has needed no radical change, in principle or practice. To reduce the cost of the process, a few minor modifications have been made. That's all! Thermit can point to an unbroken record of successful, standardized practice.

Thermit welds eliminate track joints entirely and cost no more than other methods.



Thermit welds have stood for 14 years

Not merely the process, but the actual welds themselves have met the test of time. The Thermit weld illustrated here, has been pounded under the wheels of the heaviest cars since 1912 without maintenance. This is but one of thousands of Thermit welds which have been in service for similar lengths of time with equally satisfactory results.

The best track insurance is a Thermit Weld



METAL & THERMIT CORPORATION

120 BROADWAY, NEW YORK, N.Y.

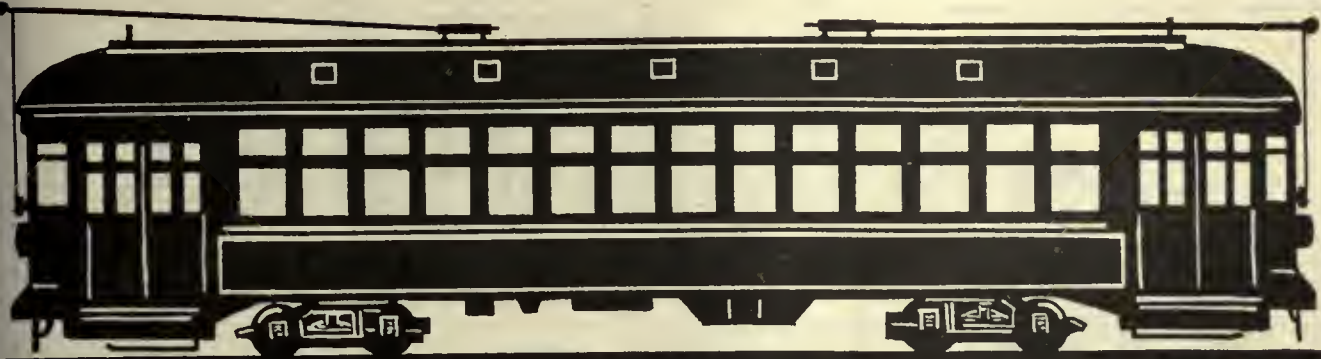
PITTSBURGH

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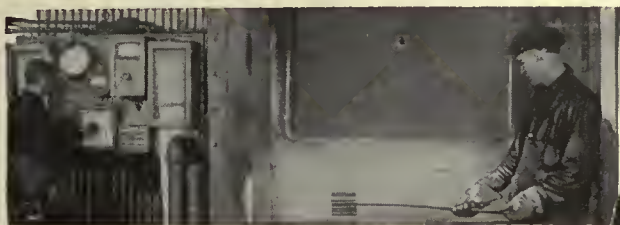
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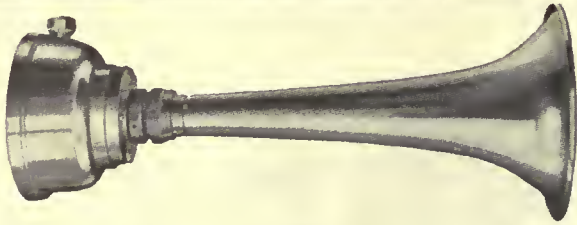
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The Strombos Signal operates on an air pressure of 10 lbs. and over and is controlled by lever valve and cord. It uses only 1/10 the volume of air required by a whistle. It has no moving parts which might fail in the emergency.

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Agents Wanted
Books and Periodicals
Business Opportunities
Civil Service Opportunities
Contracts Wanted
Desk Room for Rent or Wanted
Educational
Employment Agencies
Employment Service
Foreign Business
For Exchange
For Rent
For Sale
Franchises
Labor Bureaus
Miscellaneous Wants

New Industries Wanted
Office Space for Rent or Wanted
Partners Wanted
Patent Attorneys
Patents for Sale
Plants for Sale
Positions Vacant
Positions Wanted
Property for Sale
Representatives Wanted
Salesmen Available
Salesmen Wanted
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Sub-Contracts Wanted
Tutoring
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for
**WHEELS
AXLES
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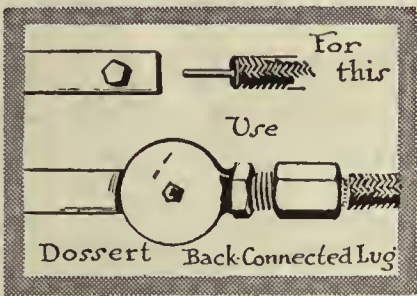
National Railway Appliance Co.

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Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago.

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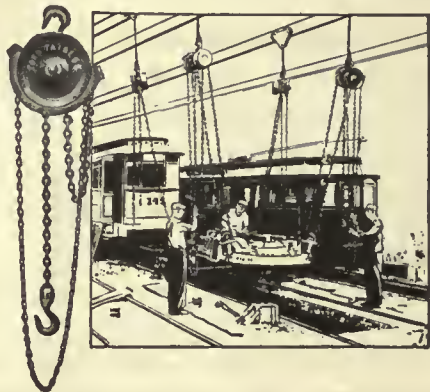
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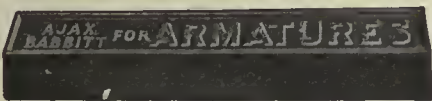
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AJAX
BABBITT for ARMATURES
keeps the rolling stock rolling



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Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

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*The practical bearing of long life
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The longevity of our wheels is not due to hard metal which is destructive to the overhead but rather to the extensive bearing surface and improved method of lubrication. The bearing improves with use and many still in service have covered 100,000 miles.

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VALDURA—you have a treat coming.

VALDURA is real asphalt paint—made from only
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We solicit a test of TULCO
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Signals

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Electrically Welded Joints

THE LORAIN STEEL COMPANY

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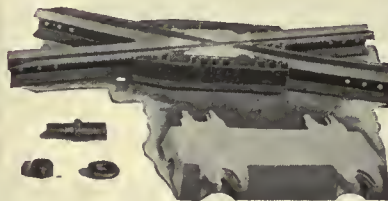
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Frogs, Switches,
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Work, Rails, Car
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Standard on
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Switches, Mates, Frogs

Complete layouts of all kinds

Made by the originators of

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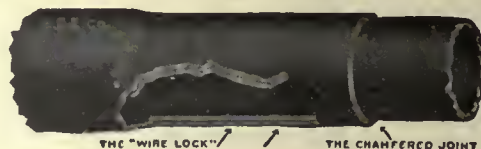
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Greatest Adaptability

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Waterproofed Trolley Cord



Is the finest cord that science and skill can produce.
Its wearing qualities are unsurpassed.

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TROLLEY WIRE

WEATHERPROOF WIRE
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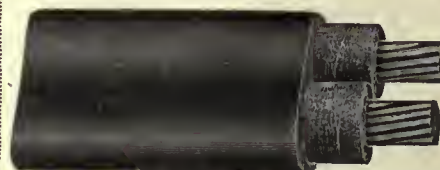
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for single track and stub end protection

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General Offices
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Branches in all
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FOR PASSING SIDINGS

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Approximately 1000 tons of same class of Rails, 60-ft. lengths.

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300 K.W. Westinghouse, 600 v. D.C., 6 ph., 60 cy., 1200 R.P.M. with 33,000 v. step down transformers complete with panel boards and instruments.

Bronze trolley ears, steel pole brackets, etc.

Thousands of poles and ties.

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Write it as the first word of your ad.

If it is a Position Wanted or Position Vacant ad, make the first word the kind of position sought or offered.

This will assure proper classification in the column. The right is reserved to reject, revise or properly classify all Want Advertisements.

*Proper Classification
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30 Birney Safety Cars Brill Built

West. 508 or G. E. 264 Motors. Cars Complete—Low Price—Fine Condition.

ELECTRIC EQUIPMENT CO.
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TO HELP YOU

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"Searchlight" Advertising

G-5

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4—300 Kw. 60 Cycle.

2—500 Kw. 60 Cycle.

Above are complete units ready for operation.

Transit Equipment Company
Cars—Motors
501 Fifth Avenue, New York

4 High Grade, High Speed, 56 PASSENGER COMBINATION (Smoking and Baggage) CARS

Exceptionally Good for Interurban Service All in excellent condition. Built by Kuhlman. Length over all, 57 ft. Height over trolley board, 12 ft. 5 in. Height over all, 13 ft. 10 in. Number of seats, 28. Type of motors, four G. E. 205. Make of trucks, Brill. Wheel base, 7 ft. Controller, G.E.—MC—74. Toilets, 34x36-in. Air Compressor, WH-D-2. For illustration of these cars, see our advertisement in the January 2nd issue of this publication. Watch for advertisement in January 30th issue, offering other types of cars.

J. W. GERKE, Railway Equipment
303 Fifth Ave., New York City

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Equipment, Apparatus and Supplies Used by the Electric Railway Industry
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Christensen Air Brake Co.

Anchors, Guy
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Illinois Steel Co.
Johnson & Co., J. R.
St. Louis Car Co.
Standard Steel Works
Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Steel
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Ajax Metal Co.
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Railway Track-work Co.
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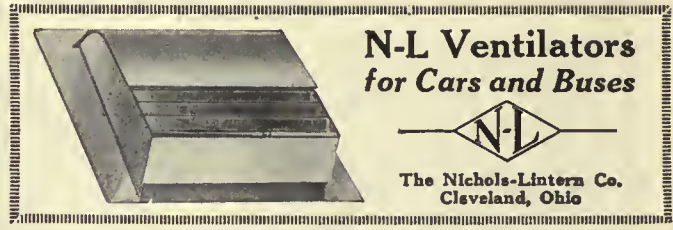
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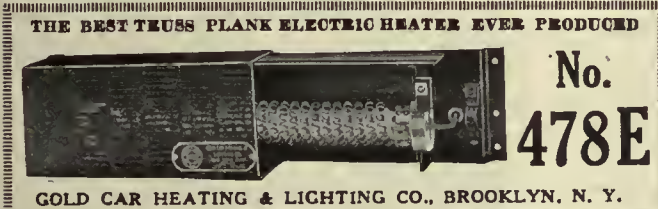
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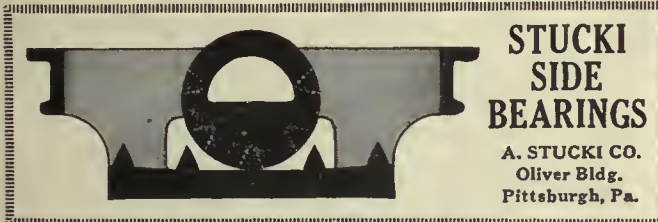
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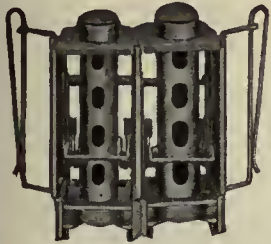
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Metal & Thermit Corp.
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Welding Processes and Apparatus
General Electric Co.

International Oxygen Co.

Metal & Thermit Corp.
Ohio Brass Co.

Una Welding & Bonding Co.
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Welding & Cutting Tools
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Wheels, Trolley, Wrought Steel
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General Electric Co.

Illinois Steel Co.

Whistles, Air
General Electric Co.

Ohio Brass Co.

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Window Paeking
Wolf Waterproof Fabric Co., L. L.

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Wires and Cables
American Steel Foundries

Amer. Electrical Works

Amer. Steel & Wire Co.

Anaconda Copper Min. Co.

General Electric Co.

Okonite Co.

Okonite-Collender Cable Co., Inc.

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Another Electric Railway Achieves Success with MODERN CARS

The Evansville & Ohio Valley Railway, in Indiana, placed in service six new modern light-weight cars built by the American Car Company and mounted on Brill low-level 77-E Trucks equipped with Brill Twin Links for the higher speed service. These cars weighed only 17 tons while those displaced varied in weight from 32 to 37 tons.

*Public Patronage can
be attracted by at-
tractive cars, substan-
tially built, and mod-
ernly equipped.*

In the short space of a few months the economy in power and maintenance and increased riding due to the modern type cars has made the investment a most profitable one.

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The old cars were good enough in their time; but times have changed. More attractive transportation is demanded and a lower operating cost is necessary, both afforded by modern light-weight cars.



Modern one-man cars have increased net receipts 102% for the Kentucky Traction & Terminal Company

For three years' operation,
operating costs per car-mile:

Maintenance of way and structure.....	3.5 cts.
Maintenance of equipment.....	1.5 cts.
Power.....	3.4 cts.
Conducting transportation.....	8.1 cts.
Traffic	0.5 cts.
General and miscellaneous.....	3.6 cts.
Total	20.6 cts.



Reliability, so vital a factor in railway operation, has not been sacrificed in the equipment produced by General Electric to effect reductions in car weights. Be sure to retain this reliability by maintaining original equipment quality with the use of duplicate G-E parts.

Modern Interurban Equipment:

Total weight of cars.....	25,180 lb.
Motors 4-25 h.p.	GE-264A
Control single-end	G-E type K-35
Air brakes.....	G-E with safety car control
Compressors	G-E type CP-27B

GENERAL ELECTRIC

ELECTRIC RAILWAY JOURNAL



Photograph by Poynter

W. Kesley Schoepf, one of the best known traction authorities in the country, who retired from the presidency of The Cincinnati Traction Company when that company was taken over by The Cincinnati Street Railway Company on November 1, 1925. One of Mr. Schoepf's less generally known achievements was his eminently successful personnel relations, fully twenty per cent of The Cincinnati Traction Company's employees at the time of his retirement having individual service records of twenty-five years or more.

...and there on his desk was a piece of ELASTITE!

SHORTLY after the sale of the Cincinnati street railway properties from The Cincinnati Traction Company to the Cincinnati Street Railway Company, which relieved W. Kesley Schoepf, President of The Cincinnati Traction Company, from the responsibilities of operating the street railway lines, an old-time friend dropped into his office to offer congratulations on the success of a dinner given by Mr. Schoepf to officials and employees of the operating companies who had been associated with him as co-workers for the latter century period covered by Mr. Schoepf's residence in Cincinnati.

Mr. Schoepf's friend was impressed by the fact that for the first time in the thirty years of his acquaintance, the retiring executive's desk was clear of business papers. True, there were plans for improvements in his country estate at Shef-

field Farm, but the only article in sight in any way relating to his traction interests was a section of rail with the Carey Elastite System of Rail Filler. Mr. Schoepf's friend commented on the presence of this model, which brought from Mr. Schoepf an emphatic explanation.

"I have been trying for over thirty years to find suitable material to fit in next to street car rails to prevent a rapid deterioration on street paving within the track area, not only as an economical proposition, but to bring about an improved appearance of both the tracks and the street pavements.

"About 1915 a representative of The Philip Carey Company brought to the attention of our Engineer of Maintenance of Way a material for this purpose, which he termed an Elastite Rail Filler. Later this matter was brought to my attention.

I was so impressed with the possibilities that I decided to experiment with some installations. In the meantime, I also concluded to try creosoted wood filler fitted into position along the rail. This, however, did not give the results anticipated and since The Philip Carey Company had, by this time, made rapid strides in the matter of production and corresponding reduction in cost, I felt impelled to close a long term contract with that company to use its material in all reconstruction and maintenance of tracks.

"This material is an outstanding improvement in track construction methods and I frankly believe it a radical departure from some of the old methods. It is proving a solution of one of the greatest problems encountered in the maintenance of paving in the track area and in the reduction in noises due to operation of cars."

THE PHILIP CAREY COMPANY, Lockland, Cincinnati, Ohio

Carey
REG. U.S. PAT. OFF.
Elastite



SYSTEM OF
TRACK INSULATION



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Increased tonnage, moved each year is evidence that the business is expanding.

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are a proven product, enabling railways to successfully serve centers of population, and surrounding territory, in all parts of the world with superior, reliable, efficient, inexpensive, and safe transportation service.

Baldwin-Westinghouse Standard

Electric Locomotives are available to fulfill any requirement for electric freight-haulage motive power.

Investigate the possibilities of profit from electric freight-haulage service. Utilize your valuable trackage and terminal rights.

A new publication, No. 1729, on Baldwin-Westinghouse Electric Locomotives, is just off the press.

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IN LAST week's issue the report of the Detroit Municipal Railway for 1925 was digested. This is the forerunner of many similar statements to be published in ELECTRIC RAILWAY JOURNAL from now on covering last year's operation of railway lines throughout the country. Annual meetings are now being held at which disclosures are made by officials of the companies on the 1925 operation, together with the election of new officers for the current year.

The financial statements which are made public following these meetings are not uniform with respect to the information they give, but every effort is made by the JOURNAL in digesting the reports to present the facts contained within their pages so that they will be of the greatest use for comparative purposes. A file of such reports at the end of a year will furnish a valuable record of railway operation and will give the JOURNAL reader a panoramic view of the financial status of all the large properties and of many of the smaller ones of the industry.

This is a service to the industry that only the JOURNAL performs.

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Bus Transportation

Electric Railway Journal

Electrical World

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(Published in San Francisco)

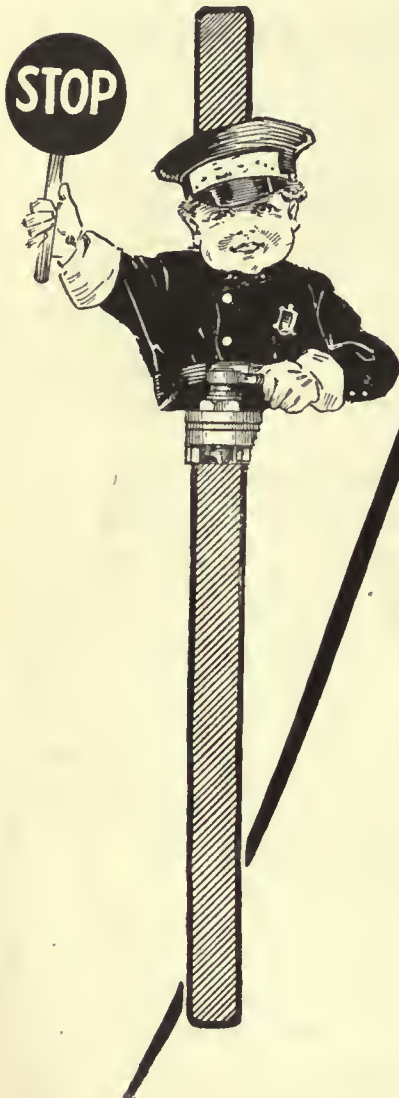
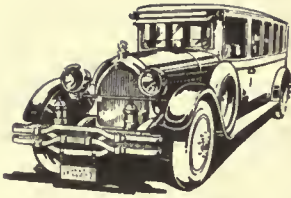
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Westinghouse Air Brakes provide that powerful, flexible, and laborless control needed to increase safety while permitting faster schedules.

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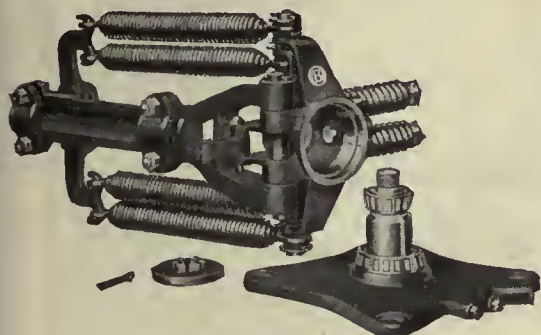


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Balanced—and on Timkens



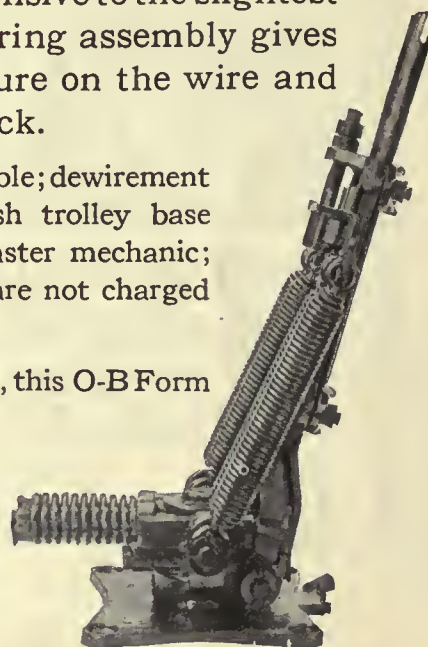
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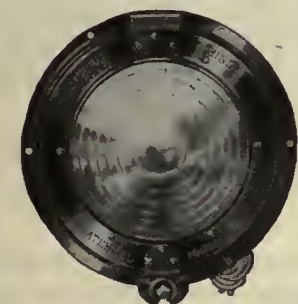
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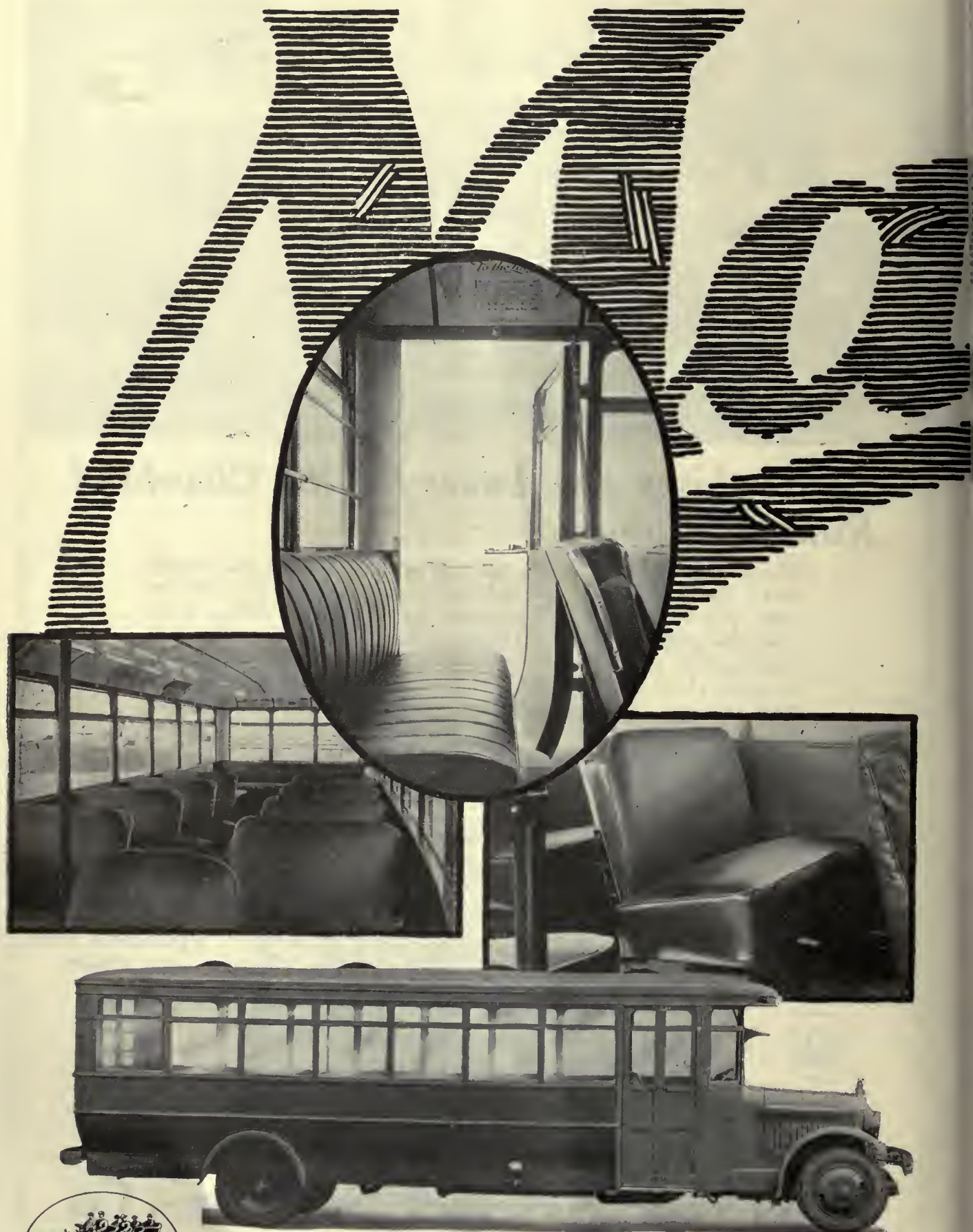
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Blowing articles of beauty and delicate scientific apparatus is the work of an artisan. Only long and highly trained experience can achieve results that mark the craftsman.

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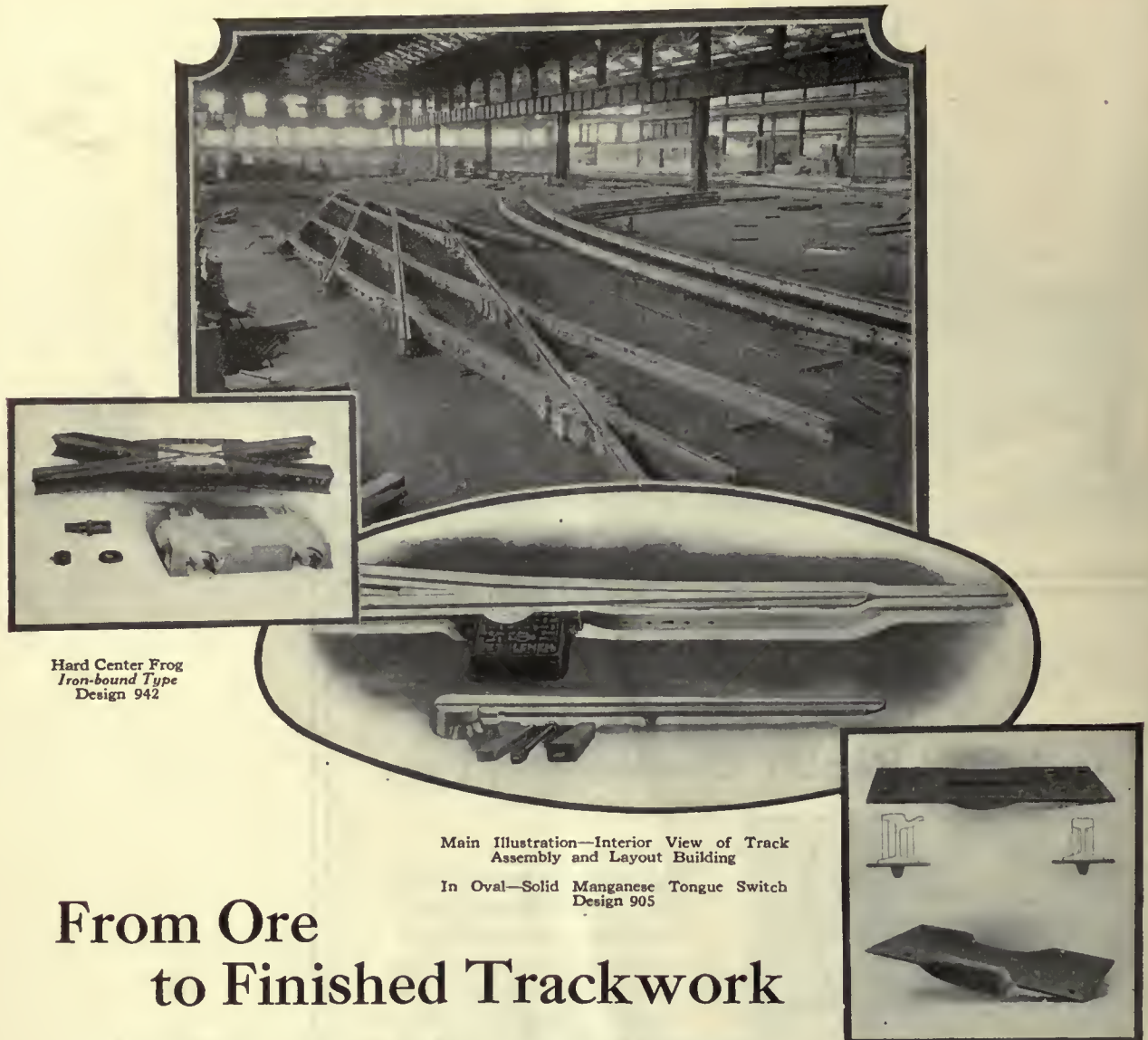
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Hard Center Frog
Iron-bound Type
Design 942

Main Illustration—Interior View of Track
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In Oval—Solid Manganese Tongue Switch
Design 905

Upper Object—Center Rib Base Plate
Lower Object—Abbott Base Plate

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MODERN ROLLING STOCK

pays for itself!

Figures are available to prove it. More inviting in appearance, more comfortable to ride in, making faster trips and shorter stops, the modern car creates increased patronage and reduces the competition of the private automobile. It builds revenue.

Lighter and faster, it operates at less cost and entails lower maintenance expense.

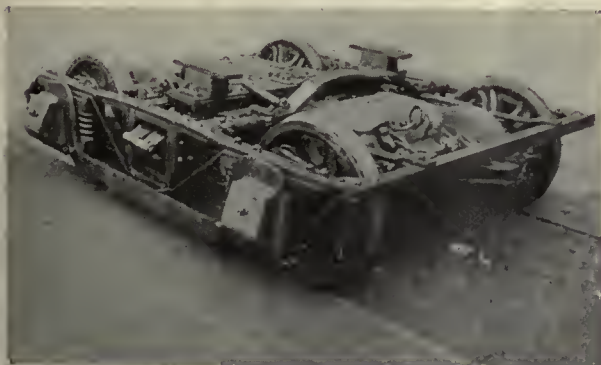
By increasing revenue and reducing costs, the new car pays for itself in a very few years.

Our engineers are thoroughly conversant with the modern features of car design and construction. Let them co-operate with you in working out plans for your projected new equipment—or we will quote on your specifications.

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GAS-ELECTRIC
MOTOR COACHES**

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Buffalo & Erie Ry. Co.
Latest type car for
speed and comfort



The rider's right to comfort!



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The new Buffalo & Erie Railway cars, with their extra fine Hale & Kilburn Seats are winning back the riders. Many another company which has recognized the rider's right to comfort is doing the same. Choose chairs and seats from the Hale & Kilburn line. The days of careless and indifferent car seating are gone.

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Gives the air of parlor car luxury. Designed to turn in a circle of but 28½ to 32 in., yet gives a perfect support and rest for the body. Every seat in the car is comfortable. To get complete comfort there must be complete relaxation

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Hale and Kilburn SEATS



Cincinnati buys SAFEWAY Six Wheelers

The Cincinnati Street Railway Company has joined the rapidly increasing group of traction companies who have adopted motorized transportation. A comprehensive motor bus program has been decided on and a definite order for forty-nine vehicles has been placed.

SAFEWAY Six Wheel Coaches will be used exclusively for two of the new bus routes. To serve them an initial order for eighteen 29-passenger SAFEWAY Coaches has been placed with the Six Wheel Company.

In selecting Six Wheel equipment the officials of the Cincinnati Street Railway Company have unquestionably been influenced by the experience of other traction companies. They know that in Detroit Six Wheel Coaches are giving tire mileage that has never been approached by four or dual wheel types.

They know that in Kansas City Six Wheel Coaches maintain regular operating schedules on icy, snow-covered streets, when four and dual wheel types must be re-routed. They know that in Cleveland Six Wheel Coaches attract so many riders and operate so economically that Six Wheel bus operation in this city has always shown a handsome net profit.

They know that in these and many other cities Six Wheel construction has definitely reduced the damage to streets and has lengthened the life of the rolling stock.

They know that every dollar invested in Six Wheel equipment will bring the Cincinnati Street Railway Company closer to the goal which progressive traction companies are striving to reach—public good will.

Complete specifications all types and delivery dates furnished on request.

THE SAFEWAY SIX-WHEELER

THE SIX WHEEL COMPANY, 1800 W. LEHIGH AVENUE, PHILADELPHIA, PA.

Manufacturers of Intercity, De Luxe, Single, and Double Deck City Type Six Wheel Coaches



20th Century Limited leaving New York

Small but important in maintaining schedules

To insure correct commutation, the brushes furnished with G-E motors are specially designed to work *with these motors*.

Therefore, when brush replacement on G-E motors becomes necessary, the wise maintenance man specifies G-E BRUSHES. He insists on original equipment quality.

In this way the New York Central, for instance, helps to make sure that service on its electrified lines is undelayed.



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GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN ALL PRINCIPAL CITIES

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

MORRIS BUCK, Managing Editor

Volume 67

New York, Saturday, January 23, 1926

Number 4

Comprehensive Program for Co-ordination by New Haven

ELECTRIC railway, steam and bus operation are all to be tied in together by the New Haven Railroad with tickets good for interchangeable traffic. It is no mean program, this upon which the road has entered, but there is no desire here to do more than to indicate its extent. Certainly in Connecticut the passenger will be able to go almost anywhere on this combined system. This is true to a lesser degree in Rhode Island and Massachusetts, but it is true, nevertheless. In Massachusetts especially has a division of territory been arranged. With the past there is very little concern. But history does repeat itself. The New Haven opposed the trolley at its inception, only later to take it over and turn it to its own advantage. The New Haven opposed the bus at its inception, only now to take over many lines that fit into its revised scheme of things.

It is, of course, unfortunate in some ways that the New Haven did not earlier see the bus in its proper light. But why dwell upon that? We do not live in the past, except those of us who have nothing else left in which to live. Despite the old adage, opportunity often knocks at the door many times. This is what it did in the New Haven case. Even now Mr. Buckland, who announced the road's new policy, appears to be overcautious. He says branch line service costs the road \$1.25 a mile, while the revenues are only 35 cents a mile. He does not look to the bus to increase the gross revenue, but he does expect greater net because the bus will cut expenses. Students of the bus who have followed it closely would be inclined to say that Mr. Buckland will probably be surprised. It certainly seems likely that he will be.

One thing is certain. The type of branch line to which Mr. Buckland has referred was doomed years ago. It had come to be an anachronism, with its stodgy, ill-painted, ill-ventilated cars of the vintage of 1875. The contrast between those vehicles and the modern bus was too great—too great for the branch line in communities that have grown, have model houses in their outlying and country districts, radios and electric lights and in which the Saturday night bath in the family washtub went out of fashion a quarter of a century ago.

This is, perhaps, homely phrasing, but it does not exaggerate the contrast between the two—modern bus and the branch line steam car. The steam railroad itself did this very thing. In the case of the New Haven it carried the passenger from New York or Boston to Bridgeport, Hartford, Willimantic or Putnam in regal style and then dumped out the one who had to go into the interior and expected him to complete his trip in a troop train. Naturally, the passenger rebelled. He wasn't interested in the rights or wrongs of the situation. He seldom is. His concern is in reaching his destination in the quickest possible

way and in the most commodious fashion. There was a time when he wasn't a free agent, but the development of the automobile emancipated him. After all, the possibilities of co-ordination are great—much greater than Mr. Buckland's statement would seem to indicate. The only fault to be found with him is that he errs too much on the side of conservatism. Still his announcement is definite and conclusive. No other similar statement made in many months is more significant than is that of the New Haven Railroad.

Pinchot Again Assumes the Rôle of Umpire

HOW it can be expected that a public service commissioner can reconcile his oath of office to decide honestly upon the intricate matters coming before him with the Governor's wishes in the matter if they should not be in accord is not well understood. The courts have often held that such regulatory bodies function for the legislative and not the administrative branches of our government, and administrative interference if not successfully resisted can only produce chaos.

Elsewhere in this issue is a story outlining the final decree of the Pennsylvania commission on the Philadelphia Rapid Transit fare case, just concluded, which has been on the docket for a year and a half.

Not satisfied with the rebuff he received from the Supreme Court when it overruled his dismissal of Commissioners Benn and Shelby, Mr. Pinchot again appears to have vented his personal feelings by withdrawing the reappointment of John L. Stewart, one of the seven present commissioners. The nomination for reappointment had been made but a few days before. Mr. Stewart voted in favor of the order granting the 8-cent fare, and the nomination was withdrawn immediately. Such seems to be the price Mr. Stewart paid for performing his duty under oath.

Without reference to the justice or reasonableness of the commission's decision, there is no evidence apparent that this body or any of its members is guilty of misfeasance or malfeasance of office. If there should develop such evidence the law prescribes more appropriate ways to punish the members than by dismissal by the chief administrator. Even if the Governor had evidence that the P.R.T. should not have received the increase, the hearings covered a period of a year and a half and the place to present such evidence was from the floor of the hearing room.

The very creation of public utility regulation was to render honest decisions based on facts. An attempt to sway judicial opinion by threat or coercion strikes at the very heart of such regulation, if not of law and order as a whole. Such policies supposedly passed with feudalism. They were the cause of overthrowing despotic Russia. To be sure it is a far cry from Pinchot to Romanoff, but tendencies to revert to such times are disturbing, nevertheless.

Progress Being Made in Control of Interstate Buses

IMMEDIATELY following the decisions by the United States Supreme Court in the case of *Buck vs. Kuykendall* (45 Sup. Ct., 324) and in that of *George W. Bush & Sons Co. vs. Maloy et al.* (45 Sup. Ct., 326, 327), it was quite generally assumed by many people that individual states, acting through their public utility commissions, could not exercise any jurisdiction over interstate bus lines or at least those which did not do any intrastate business.

Actually this conclusion was far from being warranted by the decisions mentioned. The Supreme Court, in the *Buck* case, distinctly said that state regulations adapted primarily to promote safety upon the highways and conservation in their use, where the indirect burden imposed on interstate commerce is not unreasonable, are valid under the federal Constitution. In both of these cases, however, questions of this kind were not involved. Both *Buck* and *Bush* were willing to comply with all the laws governing common carriers in the states concerned, Washington and Maryland. The trouble arose over the fact that the state commission in each case declined to permit operation without a certificate of convenience and necessity, which it refused to grant because the routes in question were being served by existing carriers. It was prohibition of operation for this reason that was stated to be within the power of Congress and not that of the individual states.

As yet, Congress has made no attempt to exercise the control which is beyond that possessed by the individual states. While Congress has empowered the Interstate Commerce Commission to supervise with great strictness the operation of interstate rail lines, it has neglected to authorize this commission or any other to exercise similar control over the interstate bus lines. Such a control over rates, routes and schedules is necessary in the interests of the public, as well as of the carriers themselves, and this is the reason that a bill is now pending in Congress to bring about such a control.

Existing Powers of States Being More Closely Defined

WHILE this discussion over a federal bill is taking place before Congress, the existing powers of states over interstate carriers are being more closely defined by the courts. These are the powers to which the Supreme Court referred in its *Buck* and *Bush* decisions already mentioned. It has been held by the Rhode Island Supreme Court, for instance, that the Public Service Commission of that state may apply regulations enforced upon similar intrastate users in regard to the number of passengers which such an interstate bus may carry at any time, or the routes it may take, as these regulations are in the interest of public safety and order and the conservation of the highways. The Massachusetts Supreme Court, in decisions rendered Jan. 5, 1926, has held that the fact that a bus line did some interstate business did not affect the extent of the regulation which the state could exercise over all of its intrastate business, and the argument that these regulations on its intrastate business might affect its profits as an interstate carrier did not make the regulations invalid.

Another particularly illuminating recent decision is one rendered by the Supreme Court of Ohio on Dec. 1,

1925, in the case of the *Cannon Ball Transportation Company vs. Public Utilities Commission of Ohio* (149 N. E. Rep., 713).

After reviewing the *Buck* and *Bush* decisions, Chief Justice Marshall of the Ohio Supreme Court points out that although the mode of transportation by motor bus is very recent, the question of the division of control by nation and state over interstate carriers is older than even the steam railroads and was thoroughly reviewed by the United States Supreme Court by Mr. Justice Hughes in the Minnesota rate cases. Thus, the state may not be able to tax interstate commerce, prescribe rates to be charged for it, or subject it to requirements beyond the bounds of suitable local protection. But it may require the right of pilotage in the case of interstate water carriers, regulate wharfage charges, exact tolls for the use of artificial facilities provided under its authority, take steps to prevent the introduction or spread of disease by interstate carriers, safeguard the inhabitants of the state from fraud and imposition, provide damages for wrongs or death by such carriers when the wrong occurs within the jurisdiction of the state, enact laws safeguarding property and life, and do many other similar acts, unless they are in conflict with valid laws of Congress.

It is obvious that the principles of commission regulation, which have proved so necessary for rail transportation lines, should be equally necessary for interstate bus lines. That these will come there is no doubt. That it is also closely in line with the approved policies of the past is also clear from what has just been said.

Competition with the Private Automobile Is Real Problem

CITY railways in the larger metropolitan districts seem to have attained some degree of success in competing with the privately owned automobile. In fact, the latter vehicle might be said to have been its own worst enemy, since its extensive use has caused congestion to the point of traffic stagnation. This condition is by no means so apparent in the smaller communities, however, and it behooves railway officials there to remain figuratively "on their toes" in meeting the problem more than half way. Private cars in use at the present time are estimated at 17,500,000, an increase of a little more than 13 per cent over the figure of a year ago. Much of this increase has taken place in the smaller cities and among farmers and suburbanites, so that the problem has become, if anything, more difficult than ever to meet satisfactorily in communities with less concentrated populations.

Authorities in many of these smaller towns are still meeting any indication of forthcoming traffic congestion by proceeding rapidly to the construction of new streets. In fact, there is probably more truth than fiction in the recent remark of an electric railway president that the only apparent excuse for some new streets was to provide additional free parking space for the convenience of automobile owners. Even though this may be somewhat of an exaggeration, it is certainly true that the conditions which have caused many individuals to give up in disgust any idea of driving through the business sections of the larger cities are still in a rudimentary stage of development in the town of 100,000 or less.

Even in communities of small or moderate size, however, there still is need for adequate public transportation. The railways must take care of the man who

cannot or will not drive his own car to work, of the woman who wishes to do her shopping "downtown," and of the child whose school is beyond comfortable walking distance.

Many economic prophets believe that the present state of national prosperity cannot continue indefinitely at its present unbelievably high level. They say that the economic house of the American people is builded upon the sands, to a certain extent, and that a depression must inevitably follow. This may mean that in the general paring down of luxuries, the abandonment of many private automobiles will naturally follow a downward swing of the pendulum. Then perhaps the railway in the small town will come into its own once more.

But operators cannot afford to sit back in their chairs and wait for the inscrutable workings of Fate to win their battles for them. Much can be done, and is being done, today, through the adoption of light-weight one-man cars and buses, as well as modernization of existing equipment, to speed up service, increase its frequency and make the railways' transportation attractive to the riding public. When this is done Mr. Man or his wife may think twice before taking the family automobile out on a cold and slippery morning in January, or a muddy and equally unpleasant day in August. Sell them thoroughly on the idea of service on the days when they are riding the trolley to save the paint on the family "bus," and much will have been done to encourage their use of the public carriers on the pleasant days as well.

Baltimore Needs to Heed Its Traffic Experts

WITHIN reason Baltimore should heed the advice of the experts who have reported the results of their traffic survey of that city. In one particular especially is there need on the part of the city's civic and commercial interests to play the game and co-operate with the railway and the commission to the fullest extent. This is in the matter of rerouting street cars. Here is where toleration is needed. It is not an easy matter to readjust lines, reroute them and shift traffic arteries. Somebody is going to be hurt. That is inevitable. The damage is going to be temporary, however, and probably in no case will it be very serious. In all such cases the individual here and there is going to conjure up in his own mind calamities that will never occur. Even at this early date there are unmistakable signs of opposition to some of the suggestions. There is just one thing about it. Those responsible for the plans have approached the problem cautiously. Their only desire is to be of the greatest good to the greatest number.

In all matters of this kind the progress that is made depends on the willingness of those affected to put aside petty personal considerations and to work for the benefit of all. Baltimore will benefit only in so far as these purely personal considerations are put aside. In the last analysis anything that is decided along broad, general lines as being best for Baltimore as a whole will be best for Baltimoreans individually in the long run. This should be self-evident. Some good will have been accomplished even though none of the suggestions come to fruition at this time, but it is unbelievable that Baltimore will write itself down as being unwilling to accept the suggestions made.

Giving Young Men a Chance Builds Up Company Morale

BESIDE the question of whether the college man fits into the field of local transportation is the problem of developing a young man's administrative ability. It is a question of the type of man as well as of training, for some men will never be more than dull, weary plodders, regardless of how much information they may have absorbed. Others become so engrossed in the technical details of their particular work that they care little about aspiring to positions requiring administrative ability. But there is always a sufficient supply of men of ambition who need merely the opportunity to develop into first-class operators and department heads.

The old school of street railway transportation was founded before the day of scientific regulation and required a lot of politics. The new school demands more open relations and a greater understanding of the needs of the public. There are very few phases of the street railway industry that are not influenced to some extent by the rising need for closer public relationship. There was a time when we let our lawyers do everything that was needed in that line; as a result the heads of corporations were usually lawyers.

The demand of today is for a spread of the idea of closer public relationship to all phases of the industry from the president down to the platform men. For the work of spreading the idea of public service there are seldom enough old heads to go around. So we must turn to our youth, remembering that the young leaders of today are the old leaders of tomorrow. Frequently the college man is easier to adapt to the making of public contact because of his developed resourcefulness and greater fund of knowledge. But other men of fair education and more than the usual amount of initiative will often suit as well.

As a particular example of how this works out in practice there is a large public utility management corporation which makes a practice of training young men (in this case mostly college men) in its ranks with the idea of developing its own executives. Besides developing its own executives it has developed a number of men who are executives of other large companies. Its properties are managed by comparatively young men. There is exceptionally good co-operation among the various departments, and there are probably few railways as much in the public eye as these because of their startling advances in the industry, and because of their willingness to accept suggestions and to share their knowledge with others. These companies have prospered financially and their public relations are exceptionally good in spite of the fact that many of these companies are obliged to operate under local regulation which is usually unsatisfactory. Results have been brought about not by favorable legislation, but rather by capable and aggressive management.

Give the young man a chance. College man or not, if a young man shows administrative ability he should have the opportunity to develop it early by receiving a little authority. Mere years are not experience. One man with the right opportunity may acquire as much experience in two years as another will in ten. It is well to curb a spirit of ill-founded egotism in a man, but it is another matter to expect him to perform dull drudgery for ten or fifteen years and crush whatever spirit is in him and then to expect him to rise to the occasion when there is need of a minor executive and one is being sought from within the ranks.

New Methods Save a Small-Town Railway

Purchase of Modern Rolling Stock, Improvement in Schedules and Skillful Publicity Resulted Last Year in a 10 per Cent Increase in Riding on the Lines of the Cumberland Traction Company — Operating Expenses Have Been Reduced from 28 Cents per Car-Mile to 21 Cents



Traffic Has Been Substantially Increased by the Operation of Cars of This Type Between Bridgeton and Millville in Southern New Jersey

RESCUED at the last moment from the hands of the junk dealer when operation ceased in the summer of 1922, the electric railway connecting the towns of Bridgeton and Millville in southern New Jersey has been built up during the past three years into a profitable business. This was done by making substantial improvements in the quality of service, by providing better cars and better headways, and by the use of aggressive publicity methods which have kept the railway constantly in the public eye.

Prior to June, 1922, this property, comprising about 40 miles of single track, was owned by the American Railways Company. Under the name of the Bridgeton & Millville Traction Company it operated interurban service between these two towns and local service in the former municipality.

Following a prolonged period of unprofitable operation a request was made to the State Board of Public Utility Commissioners for permission to abandon the entire railway system and sell it for junk. As it did not appear likely that the lines could ever be made to pay their way, this permission was granted. The company ceased operation on June 15, 1922, and began to tear up the rails.

At this time, however, Clayton W. McPherson, a busi-

ness man of Bridgeton, conceived the idea that the railway could be rehabilitated and made profitable. Against the advice of all his friends he bought it. Since the old company had planned to dismantle the property the price paid was small. Operation of the Bridgeton-Millville line was resumed with the old cars after a suspension of service lasting only three days. Local service, however, was not resumed until some months later.

Public sentiment demanded that there should be no cessation of the interurban operation to Millville. Although the distance between these towns is only approximately 10 miles and a state highway connects them, the public did not feel that bus service would be an adequate substitute for electric railway service. For this reason Mr. McPherson arranged to resume car operation immediately after his purchase.

Concerning the necessity for operation of local electric railway service in Bridgeton the public was not so thoroughly convinced. At the time when service was suspended, there was a somewhat general feeling that independent buses could handle this situation better than street cars. No attempt, therefore, was made then by the new owner to establish any local service. During the course of several months, however, the

RECAPITULATION OF OPERATING EXPENSES, CUMBERLAND TRACTION COMPANY AND ITS PREDECESSOR, CENTS PER CAR-MILE										
	1916	1917	1918	1919	1920	1921	1922	1923†	1924	1925*
Way and structures.....	3.50	2.52	3.95	4.75	6.11	4.84	4.92	2.14	2.87	2.70
Equipment.....	2.37	2.90	3.40	4.54	6.27	6.52	5.24	3.04	3.24	3.20
Power.....	3.43	4.86	5.68	5.96	6.37	6.36	5.84	4.95	4.83	4.60
Conducting transportation.....	4.90	5.64	7.22	8.29	8.74	8.75	8.53	7.12	7.03	7.00
Traffic.....	0.41	0.34	0.21	0.24	0.10	0.05	0.00	0.01	0.01	0.01
General and miscellaneous.....	2.80	2.41	2.71	3.47	3.37	3.35	3.47	5.60	3.97	3.50
Total operating expenses.....	17.41	18.67	23.17	27.25	30.96	29.87	28.00	22.86	21.95	21.10

† Operation of new cars commenced in January, 1923. * Estimated.

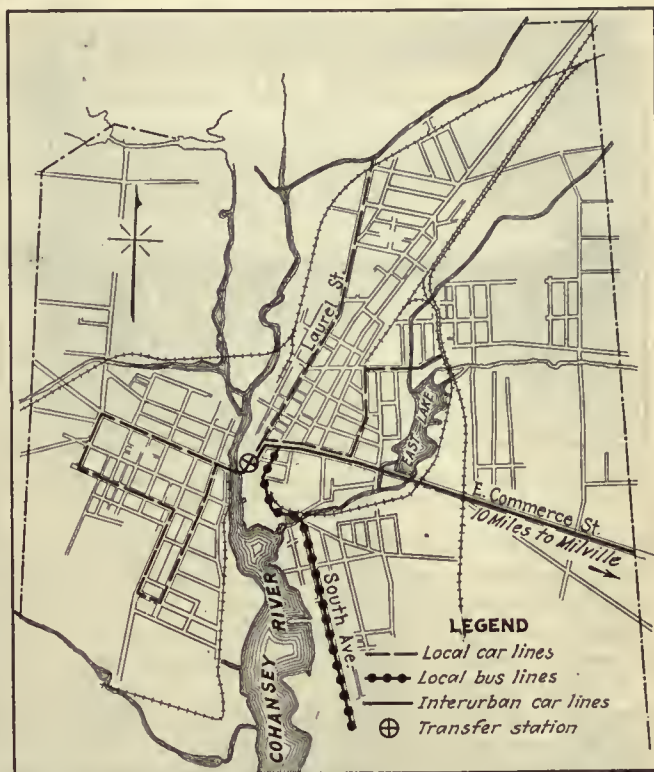
people of the town became disgusted with the character of the bus service provided by the independents and a large mass meeting was held to consider the problem of local transportation. The meeting was practically unanimous in favor of the restoration of railway service. Only three dissenting votes were cast and these came from three independent bus operators who attended the meeting.

As a result of this meeting and the sentiment expressed, Mr. McPherson agreed to undertake local service. To enable the railway to operate without loss the city agreed to release the company from paving charges. On its side the company agreed that if it should fail to make a success of the local service it would remove the rails, but would make no attempt to remove other material in a manner which might disturb the paving.

Rolling stock and track were found by the new owner to be in run-down condition. The track was not so bad, however, but that it was possible to put it in fair operating shape at a moderate cost. It was decided to scrap the old cars altogether and buy new ones. Three light-weight, double-truck, one-man cars were ordered from the J. G. Brill Company. Four Birney cars were also ordered. The double-truck cars were placed in service in January, 1923, on the Bridgeton-Millville line, and in the latter part of May the Birney cars began local operation in Bridgeton.

At present the system consists of two local lines operating three cars in Bridgeton and one local bus line. These all meet at a transfer station in the center of the town, which is also the terminus of an interurban car line to Millville. The present bus route is part of a former car line to Bivalve, 20 miles away. As the new management believed that only a short section of this line was in territory that would support transportation service, bus operation was undertaken within the city and all service suspended outside. Altogether some 15.8 miles of road are now operated. In Millville local service is provided by the Millville Traction Company.

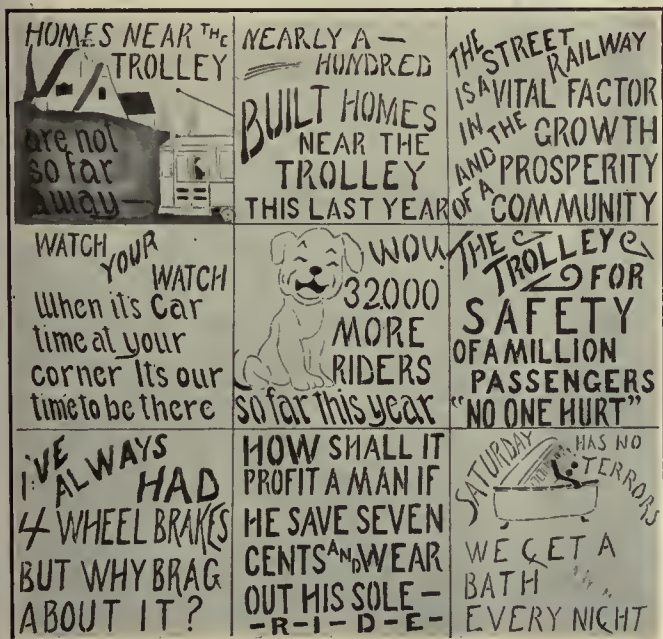
Patronage on all of the car lines has been good ever since service was resumed in 1923. The total passengers carried for that year numbered 608,551, or



Two Local Car Lines and One Bus Line Are Operated by the Cumberland Traction Company in Bridgeton. An Interurban Car Line Connects that Town and Millville

slightly less than the number carried in 1922. This was because local service was not resumed until the middle of the summer. For the year 1924 the number of passengers carried was 895,922. This figure was exceeded during the year just ended by some 87,000, making the total number of passengers 983,000. Last year thus shows an increase of about 10 per cent over 1924, which was the first full year of operation under the present plan.

For the last three months of the year the rate of increase is even greater, being about 16 per cent. It



Nine Catchy Posters Executed in Bright and Attractive Colors. They Have Been Useful in Bringing the Railway to the Attention of the Public



Several Distinct Types of Publicity Matter Are Used—Safety Slogans, Advertisements of Fraternal Organization Activities, Railway Messages, Etc.



Prospective Passengers Need Not Stand While Waiting for Cars of the Cumberland Traction Company

is expected by the management that 1926 will show still more favorable results. Financial conditions are more satisfactory than ever before on account of the increased traffic, the relief from paving obligations and the decreased operating expenses with the new cars.

Total operating expenses have decreased from 28 cents per car-mile in 1922, the last year when the old cars were running, to about 21 cents in 1925. The year immediately following the inauguration of service with the new cars, the cost dropped to 22.86 cents per car-mile, and this was further reduced in the succeeding two years. Equipment costs have been reduced from 5.24 cents per car-mile to 3.20 cents; power from 4.95 cents to 4.60 cents; way and structures from 4.92 cents to 2.70 cents.

Various methods have been adopted to promote good public relations. More attractive cars operated on more regular headways have been of primary importance in this respect. For the convenience of prospective passengers who arrive at the car stop before the time of arrival of the car, the railway has provided benches. These carry the message that "it will soon be car time."

When the company built a new concrete carhouse to accommodate its passenger cars, the service cars were placed on a storage track outside the building. It so happened that the carhouse was located directly across a canal from a pleasure park. Users of the park thought that the presence of the work cars on the storage track was a discordant note in the sylvan surroundings. The company, therefore, built an arbor between the tracks and the canal and planted roses which now have grown up high enough to conceal entirely the outside tracks and the cars in storage.

Another instance of the methods used to improve public relations is the privilege which the company grants on hot summer nights of riding all evening for a single fare. Many people spend the evening riding this way to keep cool and those who avail themselves of the privilege remain friends of the company.

PASSENGERS CARRIED DURING LAST QUARTER OF 1925

	1924	1925	Increase
Local passengers—October.....	44,229	55,530	11,301
November.....	43,892	52,595	8,703
December.....	53,814	61,375	7,561
Average monthly increase.....			9,188
Interurban passengers—October.....	27,121	29,860	2,739
November.....	26,591	29,942	3,351
December.....	29,138	30,949	1,811
Average monthly increase.....			2,633
Average monthly increase all lines.....			11,821

An aggressive publicity policy has marked the management of the reorganized company. Every week Mr. McPherson has had a message to tell the public. This has been done by means of posters carried on the front dashers of the cars. The posters are home-made and look it, but this is thought to add to rather than detract from their effectiveness.

The process of making these posters is a simple one. The design is first drawn on a sheet of paper of the same size as the finished poster. Using a manual tracing knife with a blade about 3 in. long the designer then cuts out the pattern in stencil form. The stencil sheet is next set up on an easel in front of the paper to be used in the poster. Colors are spread on by means of an air brush attached to a tank under one of the cars. Colors are used for all of the posters. Ordinarily these are artist's water colors, but oil paints are sometimes thinned out and used for special purposes.

Subject matter of the posters varies widely, as will be seen from the accompanying illustrations. Many of the posters are intended to convey some message which the railway wishes to impress upon the public. On the other hand, many have no connection with the railway. Some are safety slogans, while others simply call attention to coming events, meetings, activities of fraternal organizations, etc. Comparatively few of the illustrations are original but are copied in whole or in part from ELECTRIC RAILWAY JOURNAL, Aera, and other publications.

An unusual feature of the publicity work was posting of the World's Series baseball scores by innings on the front of the cars during that week. Score-board posters were made up in advance and placed on cars. Returns were received by radio in the center of the city. The railway had a man with a paint brush ready and when a car passed he would post the score.



Artistic Dash Poster Welcoming Members of American Legion When Their Convention Was Held in Bridgeton



Scores of the World's Series Baseball Games Were Received by Radio and Posted Inning by Inning on the Front Dashers of the Cars

Casual Observations on the Operation of European Tramway Systems

Heavy Platform Loads Create Problem in Body Design — Present Practice Favors a Longer Wheelbase than Formerly Used — Many Cars Are Excessively Heavy—One-Man Operation Has Not Been Widely Accepted

By Spectator



Double-Deck Tram Cars Are Widely Used in England as Indicated by This View of Westminster Bridge, London

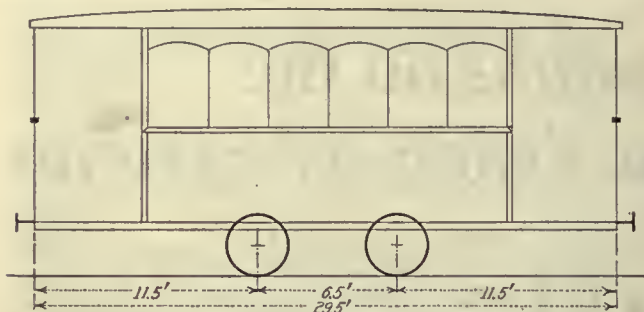
WHEN one has commenced his career in the street railway industry and has made it his life work it is difficult to abandon all interest in this subject when one goes away for a vacation. On a recent journey in England and on the Continent I saw many tramway systems, both modern and out of date, with clean cars and dirty cars, and numerous surprising differences between the practices in some countries and in others. As I did not make a trip of technical investigation, such as the editor of *ELECTRIC RAILWAY JOURNAL* took in September, 1924, I shall confine myself to indicating several peculiarities that especially struck me.

What most surprises a stranger in England is the widespread use of double-deck cars. One wonders why this type of car is not generally used on the Continent. With approximately the same dead weight and motive power this type of vehicle could transport 25 to 30 per cent more riders than a car without the upper deck, and the platform cost would remain about the same. I say "could transport" 25 to 30 per cent more because in England passengers are not allowed on the platforms, while all over the Continent it is the platform that carries the majority of the passengers. For that reason the English double-deck cars actually carry fewer riders than the single-deck cars on the Continent, although

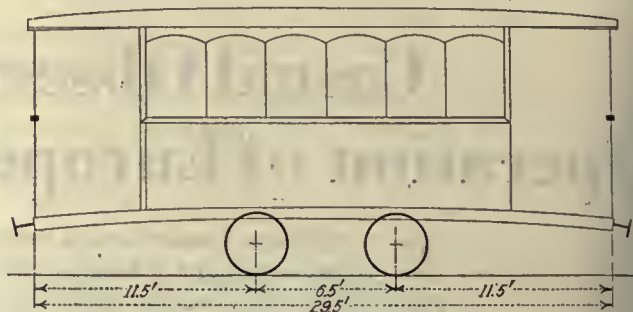
they could easily accommodate a greater number. On the Continent from 24 to 40 passengers are allowed on the platform, while inside the car in double the space there are only some 20 to 24 passengers. Thus it is the platform that earns the dividend.

These conditions regarding the distribution of passengers on the cars have a curious and interesting reaction on the construction of the car body. In England all the load is concentrated in 10 to 13 ft. in the middle of the car, while on the Continent the load is distributed from end to end.

Frequently it appears that little or no account of this distribution of weight has been taken. In many places where the platforms are heavily loaded, it may be noted that the bodies are bowed at the two ends. Perhaps that is one reason why the rigid single truck, so well thought of in America, has been able to find users in only a few countries on the Continent. The English car is supported on a rigid single truck with a base of support of about 10 ft., but on the Continent this support must be much longer. Preferably it should be extended under the platforms, as has actually been done on many cars, especially in Denmark and Germany. In France single trucks are used on a number of systems. A large number of cars, however, have a very pronounced teetering and nosing movement, to



On the English Car, Accommodating 30 Passengers Inside and None on Platforms, the Weight Is Concentrated in the Center Section. Usually This Car Would Carry a Double Deck



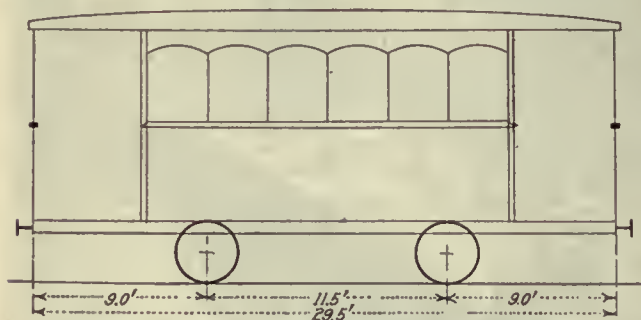
The Continental Car, with Twenty Passengers Inside and Twenty to Twenty-five on the Platforms, Sags at the Ends Unless Very Solidly Built

say nothing of those that sag at both ends. Various types of truck are shown in the accompanying illustrations.

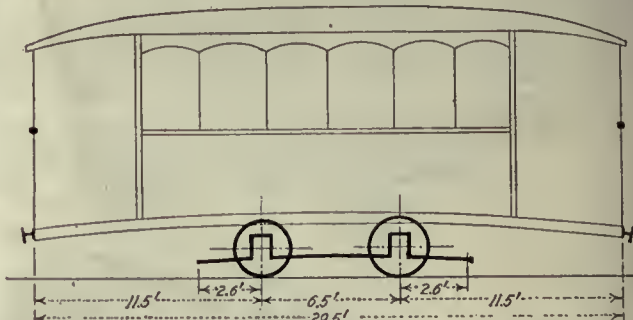
Everywhere in Europe the short wheel base is being abandoned little by little. Cars in England have a wheelbase of 8 to 10 ft. This is made possible by the use of an oscillating stirrup. From the arms of the stirrup resting on top of the journal box is suspended by means of two hinges a short piece which carries the two springs on which the body rests. The axles thus can move laterally while remaining parallel. The body plays freely in the yoke in a lateral direction only.

agement of the Paris tramways for its type L (light) cars. The wheelbase of these cars is about 12 ft.

At Barcelona I saw striking examples of the discomfort of a car with large platforms and a short wheelbase. These cars, which seemed to me to be very heavy, are more than 9 m. in length and are mounted on rigid trucks of about 2 m. wheelbase. The platforms are overloaded all day long with from 20 to 30 passengers and the cars have a pronounced teetering movement. The weight on the overhang must be at least 11,000 lb. Destruction of the roadbed is rapid and the



Type of Car with 11.5-Ft. Wheelbase Used in Europe



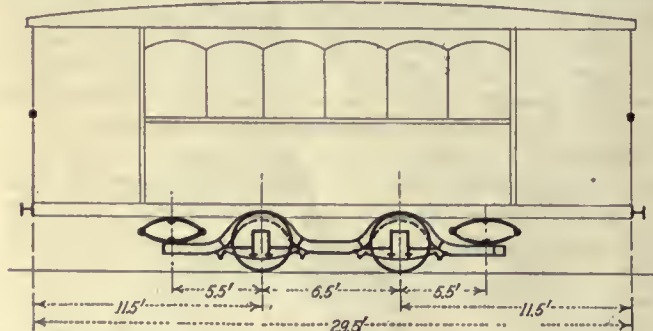
Same Car on a Truck with Short Base of Support

It appears that the freedom of lateral displacement of the axles facilitates the passing of curves to such an extent that wear and tear on the tires and the gage side of the rails is considerably reduced. So far as I know there are only one or two applications of this system on the Continent.

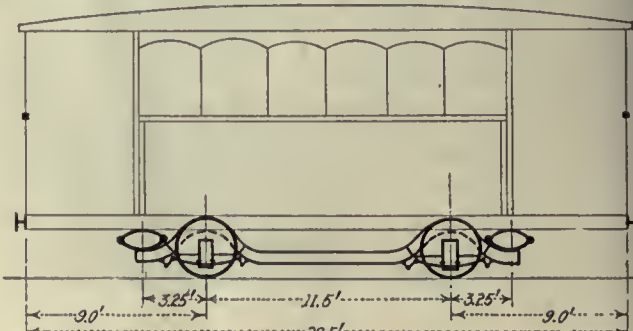
Long wheelbases are met with in Switzerland, but they usually are attained by the use of slightly radial axles. Although this is complicated and expensive with regard to maintenance, the heavy loads on the platforms make it imperative that the overhang be reduced to a minimum, and any system that permits the lengthening of the wheelbase is likely to be resorted to. Lateral displacement of the axles to permit the easy passage of short radius curves has been adopted by the man-

sum which has to be put aside annually for its upkeep must absorb a large portion of the receipts.

In several cities I saw applications of the radial truck with two axles, but only on a few cars. One would say that here and there a timid trial has been made which was not followed up. The attractive theory of such construction is well known, but in practice it sometimes is quite another thing. Experiments along this line have been made at Ostend in Belgium, at Liège and at Dortmund. A car 30 to 33 ft. in length, mounted on three axles, is used at Ghent. Technical information on the subject of this car unfortunately was not obtainable. Maintenance of three pairs of tires and the wear on the rails by three sets of wheels must surely be more expensive than the swinging system



In this Case the Car Body Rests on Springs at the End of the Truck Frame



A Still Longer Base of Support Is Obtained by Means of a Flexible Suspension and Lengthened Wheelbase



Double-Deck Double-Track Car of the Metropolitan Electric Tramways Is Typical of Many English Cars



Another Type of Car Used in England. A Removable Top Protects the Upper Deck in Winter

used in England. It would be interesting to know the reasons that influenced the management at Ghent to resort to a system of suspension from three axles.

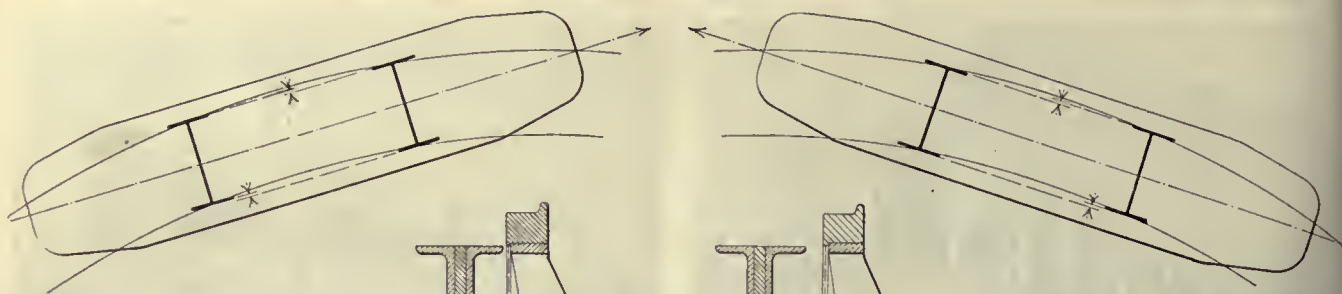
Efforts toward the use of a long wheelbase have been carried much farther in Europe than in America, a fact which may be explained by the difference in loading on the cars.

Excessive weight of the cars is an odd feature on

most of the European systems. Particularly is this true in Holland. Perhaps that is due to the character of the people, who prefer that which is solid and durable and who seek for good quality rather than cheapness. The equipment is excellent, perhaps too good, as the weight exceeds bounds of economy. The cars of Leyden, carrying 63 persons, weigh 35 tons or 1,100 lb. per passenger. Nothing makes it necessary



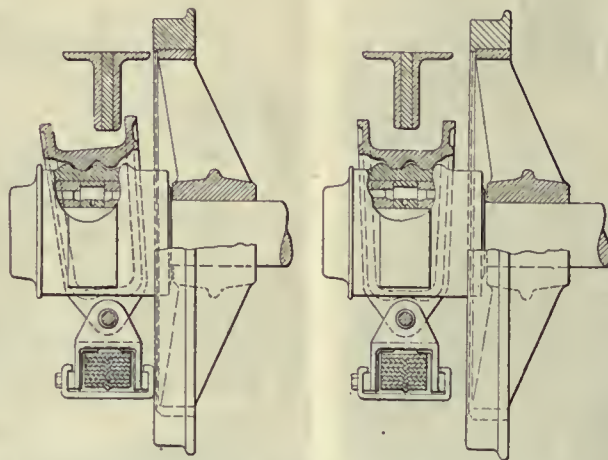
Light-Weight Car of the T.C.R.P., with Motors Mounted on the Body Framing and Axles Attached to the Body by Springs and Shackles. This Arrangement Gives About 15-In. Play for the Axles



to resort to such a weight, neither speed nor traction. The handsome cars of the tramways from The Hague to Delft, double-truck vehicles that can carry about 60 passengers, weigh about 27 tons. On the other hand, in France the Transports en Commune de la Région Parisienne has reduced the weight of its cars to 517 lb. per passenger. The management of tramways at Berlin has gone farther still. There the weight has been reduced to about 365 lb. per passenger.

An American electric railway engineer inspecting the European systems often would be amazed at the absolute lack of effort at economy. This is true despite the difficult conditions under which operation must be carried on, conditions which indicate the real need for strict economy. Heavy cars and two-man operation are examples.

Tramways that own heavy equipment and have not sufficient funds for replacement are evidently excusable, but others which have ordered new equipment since the war certainly deserve blame for squandering money without the least reason. It has been stated as an excuse that a single-truck motor car carrying 50 pas-



Normal (at Right) and Distorted Positions of Journal Box When Car with Flexible Suspension Negotiates a Short Radius Curve



The Saddle Swings from the Top of the Journal Box to Permit Lateral Movement of the Axle

sengers and weighing 13 tons will have a longer life than a car of 10 tons because the latter is less solidly built. This extra weight, however, costs 30 per cent more for power and 30 per cent more for wear. Is five years gain in the amortization of a car really worth the loss of all the economies realized during a period of perhaps twenty years?

Another thing to arouse the astonishment of the American railway engineer is the extravagant disbursements that the small systems allow themselves. For the past eight years it has been well understood in America that it is impossible to operate a system having light traffic in the same manner and with the same costs as a system having dense traffic.



Car Lines in Munich Converge at the Square in the Center of the City

In the larger cities, where the cars are almost always full, the conductor has scarcely any leisure, particularly when a system of transfers or zone fare collection requires him to distribute tickets at five or six different prices. But on the smaller systems, where the cars carry on the average not more than ten to fifteen passengers and where there is only a uniform rate of fare, the employment of a conductor is really a luxury and so is an unwarranted outlay.

Why should the small systems thus continue to lose money when the introduction of the safety car or one-man car would certainly be their salvation? For example, there exist in France some twoscore struggling systems in provincial towns that might be changed into successful operation. What can possibly be the reason for this lack of progressiveness? It may be attributed above all, I believe, to the habit of routine, the conservative spirit which in Europe holds back the development of so many businesses. The ability of the managements often leaves much to be desired. Also, the fact that tramway operations are often conducted by financiers, rather than by business men, may have something to do with the matter.

Fault cannot be found with the systems in all the countries of Europe. One country that follows closely the advances made in the last few years is Holland. The equipment is modern, although somewhat heavy, as has been remarked, and very well kept up. For cleanliness it has not an equal either in Europe or in America. One-man cars are operated on all the small systems and even on several lines in Amsterdam.

In Germany, also, the majority of the systems maintain a high degree of progressiveness, except, however, in the matter of one-man cars. These one sees only in three or four small towns.

Tramways in the south of Europe reflect the character of the population. In Italy and Spain the equipment is generally in a deplorable state. Economies resulting from progress realized during the last ten years are absolutely unknown.

GREATER AGGRESSIVENESS IS THE PRESENT NEED

During the month of July an international convention of tramway men was held at Brussels. For the question of one-man car operation was reserved the honor of the first discussion on the program. The report on this subject pointed out the danger of the introduction of the one-man car not only to the public but also to the operators. Admitting that not all one-man cars may be considered safety cars, the report is perhaps not incorrect. In it no distinction is made, however, between a car which has not been equipped with a single safety device and a car equipped with all the apparatus necessary to place the operator as well as the passengers out of all risk of danger.

In any case, the fact that the one-man car was made the object of discussion at the convention promises



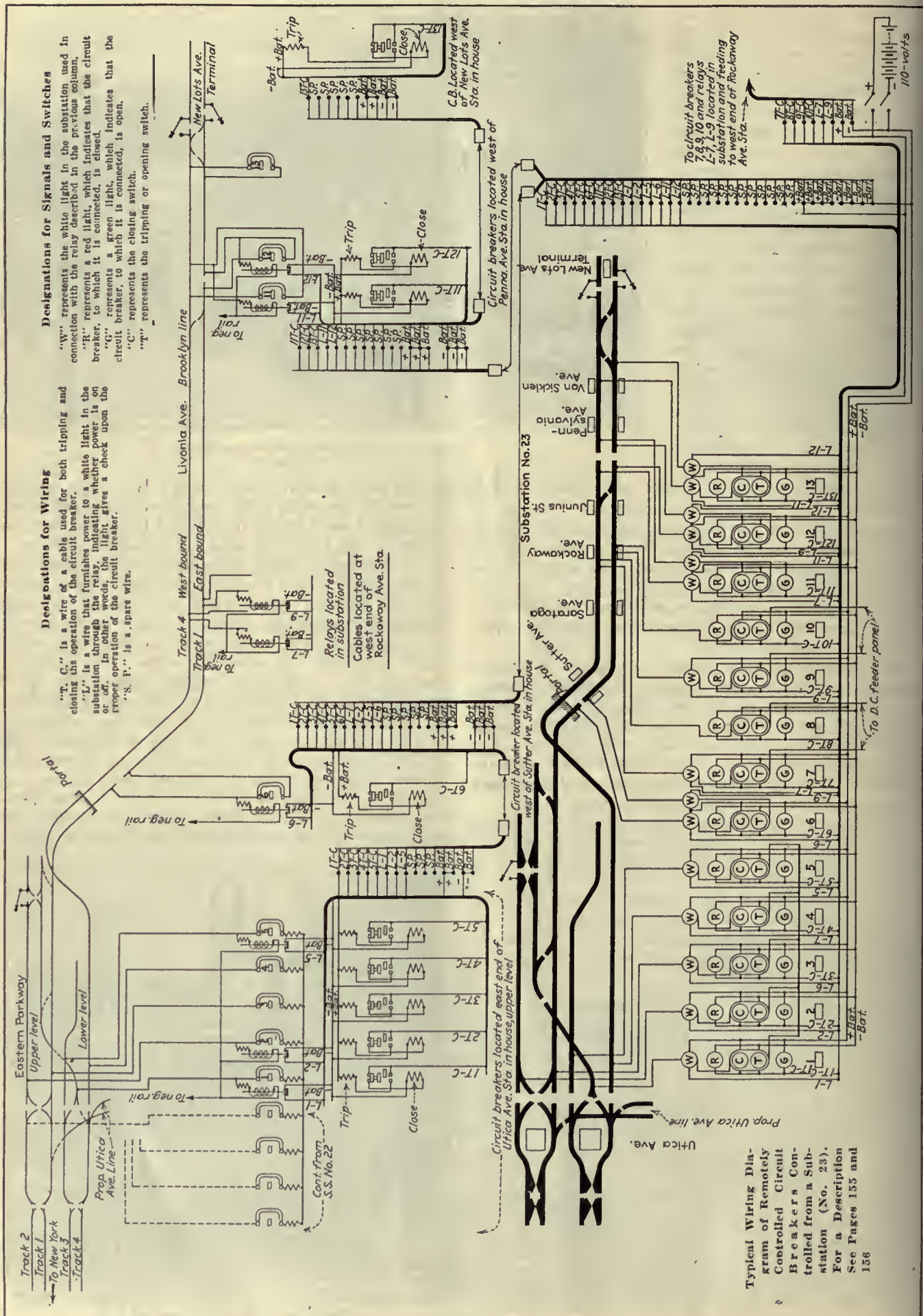
Tramway Traffic in Potsdam Square, Berlin

that it may be more widely used. When one realizes how slowly and with what hesitation important measures have been adopted in the past, however, the employees of the tramways need not feel great anxiety.

For some enterprising Americans there is a great field of opportunity in the present European tramway situation. A financial group might well merge the small struggling systems for which European managements have not found the cure, and which in their incompetent hands go quietly but surely to death. The American financier, provided he be an electric railway man, could quickly instill life into the ailing systems by introducing technical improvements and numerous economies, such as the one-man car, which in a short time would put the business on its feet. A company whose stock is now quoted at 50 on the Bourse could attain in a year or two a quotation of 100 or more. In the tramway industry of Europe itself, however, the vigor and energy needed to accomplish such a change is lacking.



Many Provincial Tramways in France Have Antiquated Rolling Stock Similar to This Cherbourg Car



Power Distribution in the Interborough

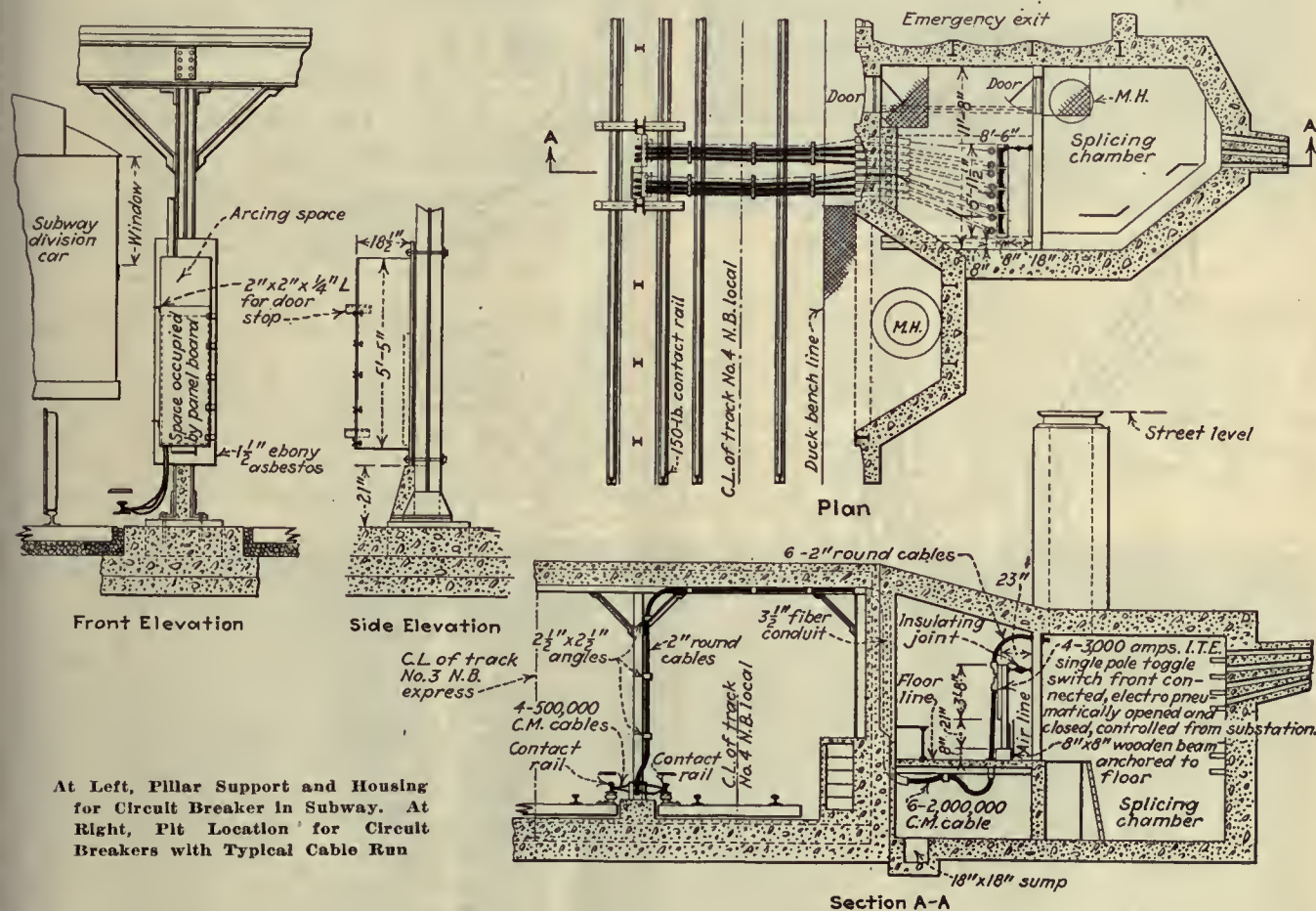
The Contact Rail Sections Are Interlocked and Connected by Electro-Pneumatic Circuit Breakers and All Are Under Control from a Centralized Station—In Consequence, the Circuit Breakers Controlling an Entire Substation Section Can Be Opened Through an Emergency Alarm Whose Boxes Are Distributed Along the Walls of the Subway

ARTICLES in this paper last year discussed the numerous safety features and other improvements applied to the rolling stock of the Interborough Rapid Transit Company and other phases of its New York subway rapid transit service. Equal care has been used in the installation of the electrical distribution system to protect against accidents and electrical disturbances, as well as to safeguard passengers against possible delay through interruption.

be given of the method by which the contact rails are sectionalized and connected up and supplied with energy from the substations, as well as how the emergency alarm works.

CABLE CONNECTION TO CONTACT RAIL

The contact rail in the tunnels is protected from the adjacent structures, and particularly from the steel columns, by means of a specially prepared board carried

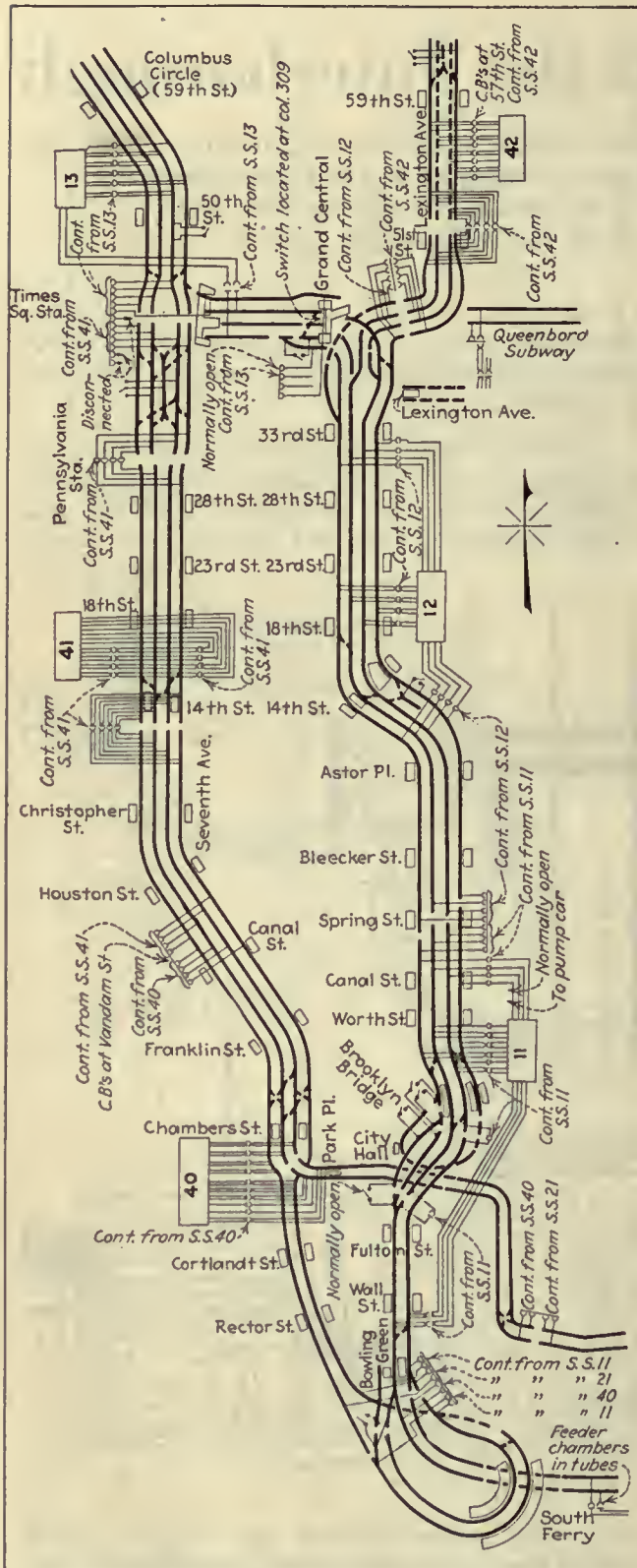


At Left, Pillar Support and Housing for Circuit Breaker in Subway. At Right, Plt Location for Circuit Breakers with Typical Cable Run

Primarily the safety features of the system depend upon the sectionalizing of the third rail, the sections being electrically connected by electro-pneumatic circuit breakers, which are under remote control from a centralized control station. In consequence, the circuit breaker controlling a section, besides automatically opening in case of a super-current flow, will open if an emergency alarm is sent from one of the alarm boxes mounted on the subway wall in that section. Reference to this emergency alarm system in connection with the sectionalized distribution system has been made in previous articles in this series, particularly in that in the issue of July 25. In this article an account will

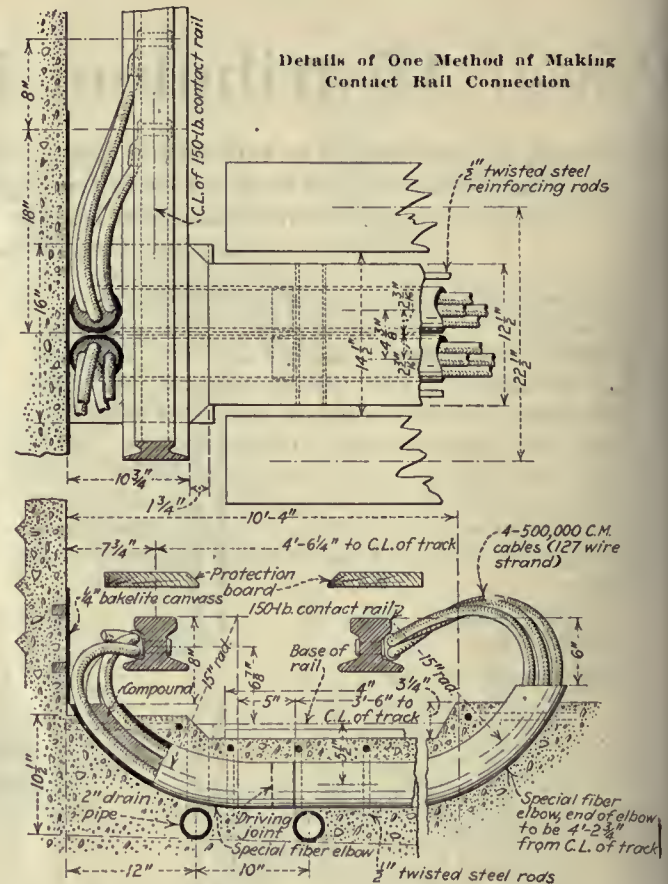
over the top of the rail and supported by properly insulated posts. The cables which furnish power from the substations to the contact rails are of the concentric type—that is to say, there is an inner core that is positive, then a layer of insulation, then a layer of wires forming the negative conductor, then more insulation, and then an outer covering of lead. The purpose of this type of cable construction is to localize any trouble caused by short circuits.

At its outer end this cable terminates at a manhole in the side wall of the tunnel where the positive and negative portions of the cable are separated, the negative lead being connected to a bus and the positive



Portion of Positive D.C. Feeder Layout Showing Location of Substations, etc.

lead carried to a circuit breaker. The circuit breaker is of 3,000-amp. capacity and is equipped with an electro-pneumatic valve for the closing operation and a trip coil for the tripping operation. The circuit breaker is mounted on an extra heavy panel. In some cases, these circuit breakers are housed in fireproof boxes and mounted on the columns, as shown in the left hand drawing on page 153, but wherever possible, a separate concrete and steel chamber is constructed as



part of the subway structure, as shown in the right hand drawing on page 153.

The negative bus is mounted in a separate chamber immediately adjacent to the circuit breakers. The negative cables are then run from this negative bus to the track rails in fiber conduit, with a sufficient thickness of concrete around the conduit to prevent water from entering it and to protect it from damage that might be caused by its coming in contact with any heavy object, as well as to afford protection against fire.

The positive connection from the circuit breaker to the contact rail is made by means of 2,000,000-circ.mil cable, insulated by an extra heavy thickness of Kerite insulation, and where it is necessary to install this cable on the steel beams it is further insulated by porcelain insulators. This 2,000,000-circ.mil cable is terminated in a specially devised pothead, constructed of concrete where it is changed to four smaller cables more easily to permit of its being bonded into the contact rails to its full capacity. This change in the size of cables is made by a mechanical connector that permits of ready disconnection whenever necessary.

At all locations where it is possible the positive cables are run underneath the track bed in the way already described for the negative cables, except that as a further insurance against the collection of moisture in the conduits under the track the conduit is filled solidly with a cable compound. Some idea of this detail may be gained from a study of the drawing above, which shows one of the several methods of making the connection, the one used depending upon conditions.

CONTROL OF ENERGY SUPPLY

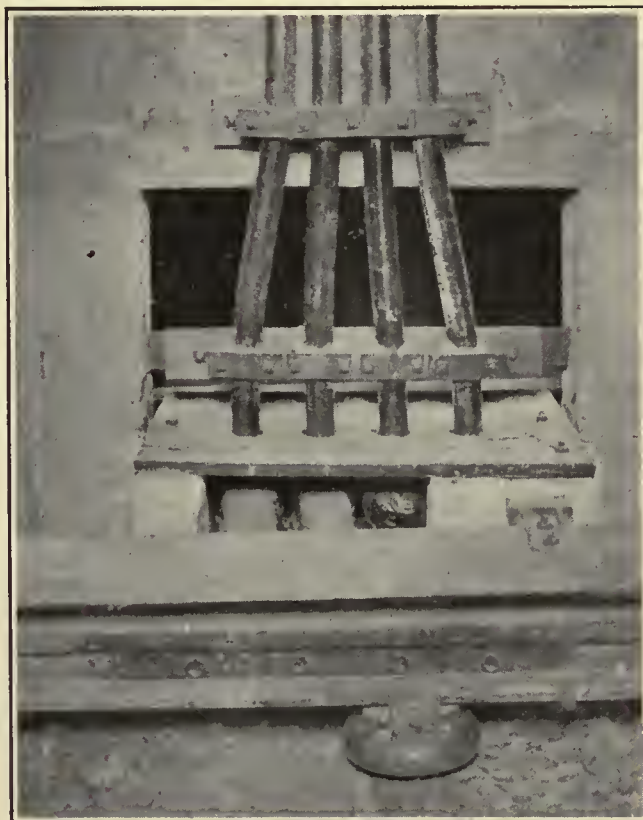
Power is furnished to the contact rails from substations located approximately 2 miles apart. The contact rails within the section supplied by power from

a substation is in full control of the operator of that particular substation, and he is under the direction of a system operator located in the main power station. This arrangement has been made possible by the control system in use by which each track section receives power through separate feeders and circuit breakers, and it permits the localizing of any trouble to the track section on which the trouble occurs. The contact rails are further sectionalized for reasons of operating facility during times of emergency, particularly at places where crossovers are located and where it may be necessary to turn or divert trains from one track to another around sections where trouble exists. This is accomplished by creating a gap in the contact rail, around which gap cables are inserted for continuity of power, the cables being in series with a circuit breaker.

In the design of this system, one of the fundamentals observed was the elimination wherever possible of any material of an inflammable or combustible character that would tend to create smoke or fumes. Where this was not possible extraordinary preventive measures were followed for the protection of materials of a combustible or inflammable character.

CIRCUIT BREAKERS AND WIRING

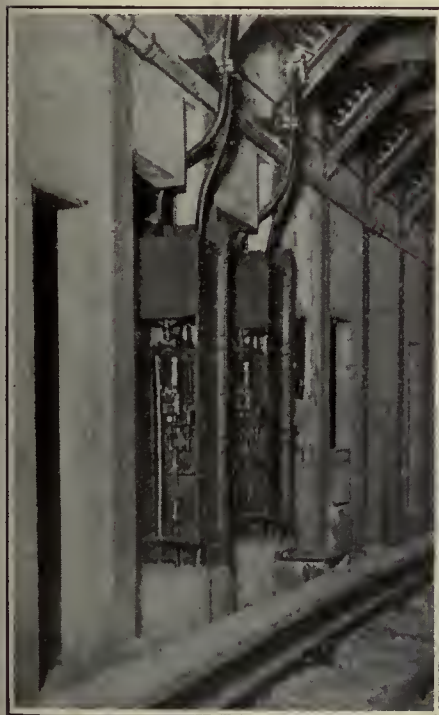
The contact-rail sections fed from each substation are terminated at points midway between adjacent substations by gaps in the contact rail, around which are cables connected to a group of circuit breakers in sufficient number to provide separate and distinct circuit breakers for each track and for each substation. That is to say, at the dividing point between substations each substation has its own set of circuit breakers. These circuit breakers are all bus-connected so that the load in all rails will be equalized. Therefore, each contact rail section generally consists of a section of tunnel in sole control of a substation operator and furnished with power from this substation, with each



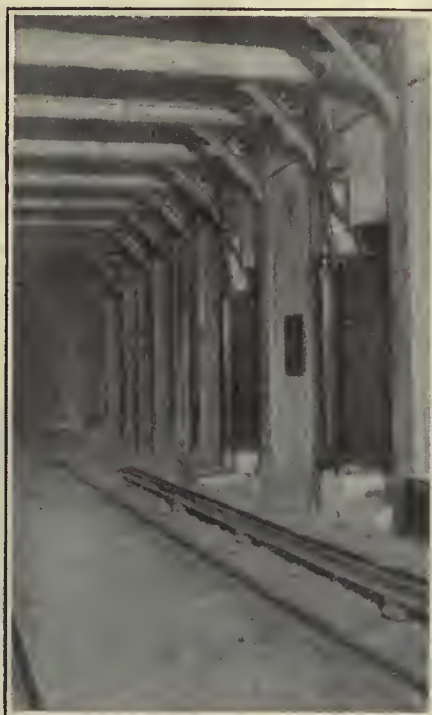
Cable Connections at 52d Street Lower Level,
Lexington Avenue Line

track and section independently operated and controlled by dovetailing into the adjacent substation feeding section, as shown in the diagram on page 154.

Each section of contact rail between the gaps is designated by a series of letters and numbers for the purpose of ready identification. So far as is possible, the designating letters employed are related to the location of the limits of the section.



Circuit Breakers in Boxes on Columns, with
Boxes Open at 136th Street and Alex-
ander Avenue



Circuit Breakers in Boxes on Columns with
Boxes Closed at 129th Street and Lex-
ington Avenue



Front View of Group of Circuit Breakers
in Chamber at 79th Street and Lexington
Avenue

The wiring system for the control of the circuit breakers is shown in the large drawing on page 152. Its operation is as follows: In times of emergency, the emergency alarm boxes located throughout the tunnels are operated by any employee at or near the trouble. Operation of this emergency alarm causes the main feeder breakers in the substation to open and simultaneously to open the equalizing circuit breakers at each end of the substation feeding section. The result of this operation is that the supply of power is then discontinued within the limits of the line fed by the substation. Properly authorized officials in the field are then placed in communication with the system operator, when the proper procedure is decided upon for the resumption of operation. On receipt of these instructions the system operator issues the necessary orders to the substation affected.

This system of control wiring involves the use of control cable throughout the entire length of the subway. This cable is carried on the walls of the tunnel, so that in event of electrical disturbance in cables in the duct line it will be as far removed from trouble of this sort as possible. It is of a rubber-covered type, with specially designed outer covering and support, and of necessity is made up of many conductors, the number of conductors depending upon the number of circuit breakers to be controlled by a particular substation.

The description of the contact rail system just given applies only to the tunnel portions of the Interborough Rapid Transit Company. While the general features of the contact-rail system on the elevated structure of the company are somewhat similar they differ in a number of particulars, especially on the outlying sections of the elevated structure.

Piedmont & Northern Builds Articulated Locomotive

Cab Is Mounted on Four Trucks, Each Pair Being Swiveled Under a Center Beam with the Two Beams Linked Together at Their Inner Ends

CONSTRUCTION of an articulated electric locomotive not long ago added an important element to the equipment of the Piedmont & Northern Railway, Charlotte, N. C. This locomotive, which was designed and built in the shops of the company at Greenville,

S. C., has a tractive effort of about 39,000 lb. and will haul trains of 1,400 tons at 20 m.p.h. In a number of respects it is similar to the locomotive of the Illinois Traction System which was described in *ELECTRIC RAILWAY JOURNAL* for Jan. 31, 1925, page 187.

Over-all length of the Piedmont & Northern locomotive is 64 ft., while the height is 15 ft. 5 in. and the width is 9 ft. 10 in. The weight is 95 tons.

Running gear consists of four trucks built by the Baldwin Locomotive Works. Each truck has a 7-ft. wheelbase. Each pair of trucks is swiveled under a rigid box-girder center beam, the two beams being linked together at their inner ends. The outer ends are built up with the necessary side and cross members to carry the platforms, bumper beams, draft gear, etc. The total wheelbase of the locomotive is 54 ft. 8 in.

Each axle carries a motor, thus giving eight pairs of driving wheels. Current is drawn from a 1,500-volt trolley. Motors are of 145 hp. each, built by the Westinghouse Electric & Manufacturing Company, and are of the interpole type with field control to give four running points. Control apparatus consists of two 65-C-13 line switches, two 65-B-27 switch groups and two 84-C reversers, together with other auxiliaries necessary for electro-pneumatic control. Air is furnished by two YE-6 dynamotor air compressors, furnishing 100 cu.ft. of air per minute. The motors are ventilated and cooled by forced draft ventilation.

A steel cab 46 ft. 9 in. long is carried on two main bearings pinned to the center beams. On each side of the center two 8-in. channels act as floor stringers, running the full length of the cab. They are fastened by a plate riveted across their bottoms. These form the side walls of air ducts in the system of forced ventilation for the motors. Except for these plates none of the longitudinal members of the cab is bored for passage of pipes, conduit or other equipment.

The grid chamber located in the middle of the cab runs from the floor up through the roof. It is open below and covered at the top by the monitor roof, thus affording good ventilation. This chamber is particularly roomy and grid frames are so arranged that any one can be removed easily. All equipment in the cab is so located as to be readily accessible for inspection and repair. Units can easily be removed without disturbance to the others. Wiring is in conduit and is so arranged that each circuit is as short as possible. The locomotive can be operated from either end.



Articulated Locomotive with a 54-Ft. 8-In. Wheelbase and Eight Sets of Driving Wheels

8-Cent Fare Granted to P. R. T. by Pennsylvania Commission

By John A. Dewhurst

Associate Editor ELECTRIC RAILWAY JOURNAL

Report of the Commission Is Briefed and an Outline of Interesting Events Leading Up to This Last Decision Is Presented—History of Case Just Concluded Extended Over Nearly Two Years and Was Fraught with Interference by the Governor That Strikes at the Very Heart of Good Public Utility Regulation

BY ORDER of the Public Service Commission of Pennsylvania the Philadelphia Rapid Transit is permitted to charge an 8-cent cash fare with a 7½-cent token, two being sold for 15 cents. The order of the commission, dated Jan. 12, makes permanent the temporary grant made on Sept. 8, 1924, that increased the fare from 7 cents cash and 6¼-cent tickets (four for 25 cents).

There has been perhaps no more interesting series of cases in the annals of public utility regulation than those recently held in Philadelphia. The last case, started July 21, 1924, has been a climax to a series of proceedings which has kept the company before the Public Service Commission and the courts of the commonwealth without important interruption since June, 1920.

During this last case Gov. Gifford Pinchot caused considerable trouble by dismissing Commissioners Benn and Shelby. The Governor assigned no reason for his action, but it was inferred that he was displeased with the progress of the P. R. T. case and the attitude that the commission was assuming. The Superior Court of the state finally overruled the Governor and allowed the commissioners to resume their seats on the commission.

The report and order of the commission under date of Jan. 12 was approved by four of the seven commissioners, a bare majority. Richard W. Martin dissented, and in a memorandum states that he will file a minority report as soon as he can prepare it, and Commissioners Scattergood and Evans refrained from voting on the report for the reason that the Bureau of Cost and Statistics will not be able to complete its analysis of certain specific testimony for several weeks.

Following the decision granting the fare increase based on the commission's report, abstracted below, Governor Pinchot again indicated his displeasure by withdrawing from the Legislature the reappointment of Commissioner John L. Stewart of Bethlehem, Pa., apparently because Mr. Stewart was one of the four commissioners voting in favor of the commission's order.

Since the announcement of the commission's decision, many claims and counter-claims, some quite bitter in their content, continue to fly back and forth.

Prior to June 1, 1920, the company charged a 5-cent cash fare and at many important transfer points, largely in the downtown district, charged an additional 2 cents for an exchange transfer, although it had many more in number of so-called free transfer points. The company's first proposal and also its second proposal, submitted in October of the same year, called for a

basic 5-cent fare and the elimination of practically all of the 3-cent exchange tickets and a charge at certain other transfer points. Both were condemned by the commission.

About the same time there was a serious break in the board of directors of the company over the type of fare structure, whether it should be an increase along the lines of retaining the 5-cent basic fare desired by T. E. Mitten, then president of the P. R. T., or a horizontal increase keeping the fare structure essentially the same. The break in the board of directors finally resulted in the resignation of E. T. Stotesbury of Drexel & Company, and several other banking members of the directorate, who were in sympathy with Mr. Stotesbury's views. Prior to the disagreement of the board of directors, the question of the type of fare increase was submitted to three nationally known engineering concerns. The majority opinion of these engineers was in favor of the horizontal increase and they recommended the fare that was finally ordered by the Public Service Commission on Oct. 18, 1920, of 7 cents and four tickets for 25 cents. The commission directed that this fare be charged for a period of six months; and at the end of the six-month period the company on its own motion continued in effect the fare prescribed by the commission.

The city of Philadelphia and certain local associations protested any increase and asked that a valuation of the company's properties be determined and be used as an aid in fixing the reasonable rates. On Sept. 23, 1920, the commission began to hold hearings and receive evidence bearing upon the fair value of the company's property, which proceeding soon became known as the valuation case.

The commission states in its report that the record produced in this case was the most extensive ever made in any of its proceedings, and contained evidence upon nearly every subject pertinent to the pending issue. The hearings were not concluded until May 15, 1923, and on June 21 of the same year the commission handed down its findings of the then present fair value of the company's property of "substantially upward of \$200,000,000." The fair return allowed by the commission was 7 per cent, equaling \$14,000,000 annually.

The city of Philadelphia and other individuals, not including the company, immediately appealed the case to the Superior Court of the Commonwealth. This court affirmed the findings of the commission and established two important things: First, that the fares then in effect were lower than those on the average elsewhere and, second, that the fares were not yielding the

minimum fair return which the company might demand under its constitutional rights.

During the intervening years it appears that Mr. Mitten has temporarily abandoned the 5-cent fare theory, although he has often since then publicly stated that he believes this fare would produce the best results to the company and the public served. On July 21, 1924, the company filed its application in the present case, asking permission to increase its cash fare from 7 to 8 cents and its token fare from 6½ to 7½ cents. Again the city of Philadelphia and others protested, and hearings before the commission were started on Sept. 2, 1924.

Assuming the burden which rested upon it, P. R. T. went forward with evidence in support of its application, which the commission has stated established, *prima facie*, three things: First, that the 6½-7-cent fares had not earned the allowable gross revenue or net revenue, indicated in the valuation decision; second, that commencing in the spring of 1924 and continuing through the summer, the extent of riding had decreased and was decreasing; third, that some increase in expenses had to be met apart from the increased labor costs, which it was claimed in 1925 would be \$1,700,000 higher than in 1923. After hearing and cross-examination, the city moved for adjournment on Sept. 6, in order to prepare its case. Two days later the adjournment asked for was allowed, and at the same time the commission granted the P. R. T. permission temporarily to collect the fares asked for. The commission realized that the case would be drawn out over many months and desired to provide an actual test of the proposed fares in place of estimates.

Once again the city and other protestants appealed from this decision. On Sept. 19, 1924, the Superior Court denied the request that the appeal act as a *supersedeas*, filing an opinion wherein it held in part: "The hearing before the commission made out a *prima facie* case justifying the proposed increase in fare. This, *prima facie*, may be rebutted or overcome by evidence produced by appellants when they have completed their investigation; but, when the hearing adjourned, the burden resting upon the company had been met."

So much for the appeal as a *supersedeas*. Upon the appeal itself the Superior Court at the hearings and final arguments handed down its opinion on Dec. 5, 1924, affirming the report and order of the commission. It is worthy of note that the commission's action was thus affirmed despite the court's holding that the wage dividend as then paid by P. R. T., amounting to \$1,900,000 yearly, was not a proper charge against operating expenses.

The proceedings during this case and in the months that followed, were fraught with much bitter feeling and caustic comment by many individuals and groups. The commission, unswerving in its performance of duty, commenced subsequent hearings in April, 1925, and concluded them in September of the same year. It had before it at the close of the hearing a full twelve-month record of gross earnings under the new fare, so that the briefs and arguments developed no important disputes on this item. While the commission supported the company's view as to the question of increases, it frequently had to rule upon arguments presented by the company, one of which is of general interest and is cited in the commission's report.

In its brief the company advanced the following conclusion and contention: "The simple fact is that

the Philadelphia rider pays the average price for a service vastly superior to the average. It conclusively refutes any claim that the fares charged are more than the service is reasonably worth."

The commission states that it cannot accept this argument. In the words of the report:

While the record does demonstrate that the company's service is notably a good service as compared with other cities, and while it also appears that the present fares are not higher than the approximate average prevailing elsewhere, these facts alone cannot establish the conclusion upon which the company insists. . . . It is also true that proper comparisons furnish some tests of the value of the service, but no final conclusion on that subject is possible without considering the cost of the service to the company. Throughout all business life cost has a direct and important bearing on value, and to determine value without an investigation of cost is well-nigh impossible.

We should not be understood as holding that cost is the sole or absolute measure of a reasonable rate, for our courts have decided that: "Rate making contemplates fair dealing between the company and the public. . . . The mere assurance that the investment will not be confiscated will not suffice."

The commission's report altogether is contained in a 34-page typewritten statement. It goes on to analyze in detail the revenue and the operating expenses, paying particular attention to such points as were attacked in the arguments of the protesting parties to the case.

During these long discussions, lasting through many months, the company argued with great earnestness that the system of public utility regulation in Pennsylvania does not take from the managers of utilities the rights, duties and discretion of management; that the regulating body is not vested with the powers of management, and cannot substitute its discretion for that of the managers, and that the commission's only function in passing on the reasonableness of operating expenses is to correct any gross abuses of managerial discretion, if such appear. To this argument the commission replies in its report:

This proposition is too broadly stated. Conceding that the commission may not itself assume the discretion of management, it is nevertheless clear that it is the commission's duty to see that discretion is reasonably exercised and to check and correct any unreasonable exercise of it.

Wages presented an interesting argument in these hearings, since at the beginning of the hearing the company paid a maximum of 70 cents per hour and a 10 per cent wage dividend, making in effect the total wage to trainmen 77 cents per hour, which the company admitted to be the highest wage paid to street railway trainmen throughout the country in 1925.

It may be explained here that the so-called wage dividend was established by P. R. T. several years ago and applied to all employees. This dividend was to be paid only if earned and after the common stock dividend. By the consent of the employees' association this dividend was paid into a pool, from which the common stock of the company was purchased in the open market.

Following the acceptance of this wage as not unreasonable or excessive, the report passes to the legal question, and the following extract from the commission's report is of interest:

Prior to 1925 the company's wage arrangement included a contingent payment limited to 10 per cent of the base wage and designated a wage dividend. The bargain with the men provided that they should receive a certain base wage on each pay day and at the end of the year an additional payment up to 10 per cent, but payable only after payment of the current dividend to stockholders. All pay-

ments of this wage dividend were made to trustees for the men, who invested the money in the stock of the company almost exclusively.

The company in the past treated this wage dividend precisely like all other wage payments; that is, as an operating expense. The lawfulness of this course was first questioned upon the appeal from our temporary order in the present case. In brief and argument upon that appeal, the city urged that the contingent feature of this payment placed it subordinate to dividends upon the company's stock and therefore made it in law a payment out of profits, and not an operating expense. The Superior Court sustained this contention.

This commission does not interpret the foregoing as containing any expression of opinion by the court as to the amount of a proper wage. It is clear that the wage dividend was removed by the court from operating expenses solely because of its contingent feature.

Subsequent to this decision, the company in April, 1925, abolished the wage dividend and raised the base wage to 77 cents, which it undertook unqualifiedly to pay to its men.

Unquestionably this action removed the contingent feature above discussed from any portion of the 77-cent wage and no argument to the contrary has been advanced. Concededly this action was taken in view of the Superior Court's decision and in our view it fully met the requirements of that decision.

The fact that a part of the resulting total wage is, by the men's direction, paid to trustees designated by them and invested in the stock of the company does not render such payment any the less a wage. Such arrangements are not uncommon in our industrial life. In the present case the records show that the men have unanimously authorized the arrangement and further that upon retirement from the service or upon death every man or his personal representative as the case might be received from the trustees the proportionate share of the funds in their hands. In the meantime they and they alone receive the income.

After a long and detailed discussion on the question of maintenance, the commission states:

Upon a careful consideration of all the evidence bearing upon this question, the commission concludes that the company's maintenance and renewal appropriation does not appear unreasonable and it would not be justified in disallowing any part of it as proper operating expenses.

In the same way the commission supports the company's contention as to the operating expenses under Power and Conducting Transportation. Referring to the general and miscellaneous accounts, the company urged that these expenses had been high because they included several large items for litigation expenses that may not recur. The commission contends that while they may not, it cannot say that they will not, for the company, like any other citizen, has an inalienable right to defend or assert its rights in all appropriate courts and tribunals.

The commission again stated that it cannot undertake to become the manager of this or any other utility and substitute its discretion for that of the manager, and concludes that for the reason given it is not warranted in disallowing any part of the company's 1925 general and miscellaneous appropriation of \$4,750,-880 as proper operating expenses.

In examining the tax items under consideration, the commission held that each item would be allowable or disallowable judged on the basis that the company owned outright the entire system and held that leases (several of which the P. R. T. holds) that only passed on a tax, but did not create a new tax, should be allowed in the company's budget, just as if the company owned the physical property outright. The company cited many decisions of state and federal courts substantiating their opinions on this subject.

The report states that the applicant owns all the stock of the Philadelphia Rural Transit Company, operating the bus lines in the city of Philadelphia and

adjoining counties, as well as of the Pennsylvania Rapid Transit Company, which operates a line of trackless trolleys in South Philadelphia. While no investigation was made as to the operating expenses and revenue of these companies, nor were their respective properties included in the valuation, the report states that "it appears, however, that during 1925 the Philadelphia Rural Transit Company incurred a deficit of about \$200,000." The commission states that it is of the opinion that it is not called upon to determine at this time whether the operation of motor buses should be considered as merged in and consolidated with the street car operation in a rate proceeding.

The results of the determination of the commission with respect to revenues and expenses are summarized as follows:

OPERATING REVENUES	
Estimated passenger revenue.....	\$49,018,357
Other operating revenue	707,000
Total	\$49,725,357
OPERATING EXPENSES	
Maintenance and renewals	\$8,560,400
Power operation	3,885,000
Conducting transportation	15,942,000
General and miscellaneous	4,750,880
Taxes	2,951,491
Frankford Elevated rental	468,120
Total deductions from operating revenue.....	\$36,557,891
Operating income	\$13,167,466
Non-operating income	235,000
Available for fair return	\$13,402,466

This amount of \$13,402,466 is below the return contemplated as fair in the valuation case, even when the deduction of \$444,000 on account of federal income tax is included in the equation. When it is considered that the Frankford rental alone increased during 1926 in the sum of \$156,000 and that increases will also occur in substantial amounts in gross receipts and taxes and other items in the operating budget, the margin will be accordingly increased.

German Street Car Accidents Analyzed

CAUSES of accidents and the means of their reduction are dealt with at some length by Herr A. Wolf in a recent issue of *Verkehrstechnik*. Taking as a basis the traffic accidents in Germany from 1899 to 1919, the figures relating to street railways show that 43.77 per cent of the accidents were sustained by passengers and 56.23 per cent by pedestrians. Of the total only 8.38 per cent were due to street railway operation. The majority of passenger accidents were caused by boarding or alighting while the cars are running, sudden application of the brakes, and collisions. Folding steps and gates on the rear platforms would, he believes, reduce accidents due to the first cause.

Although less than 10 per cent of the accidents are due to rolling stock and the work of the operating staff, the writer considers that steps should be taken to secure a reduction. More attention should be given to improvement of brakes. Stops should be selected with great care and when they are located in the middle of the roadway safety zones should be provided. The author believes that running the street cars along a route off the public highway would not only reduce the number of accidents but enable a higher speed to be safely maintained. In conclusion, greater attention to trolley lines and more careful selection and training of the railway staff are recommended.

The Readers' Forum

Committee on Management and Operation Planning Big Program

NEW YORK CITY, Jan. 16, 1926.

To the Editor:

It has been at times apparent that there has been some confusion about the purpose and work of the committee on management and operation. This is perhaps natural, partly because of the comparatively short time this committee has been in existence and partly due to the broad scope of its activities.

In attempting to clear away any misunderstanding that may exist, it might be advisable to set forth briefly the history that led to its organization. This work was first conceived by Britton I. Budd when he was president of the American Electric Railway Association. Originally there were two committees, known as the committee on city operation and the committee on interurban operation. Their function was to make an actual survey of conditions in the industry and preach the gospel of modernization. Although these two committees have been combined into one and the name changed to the committee on management and operation, Mr. Budd's original thought of modernization has been consistently carried on through two years.

The committees by visits to properties in every section of the country have discussed with electric railway operators the solution (through the adoption of modern methods and practices) of the most important problems with which the industry has been faced in recent years. These discussions have covered such matters as the automobile and the motor bus; public relations; employee relationships; popularizing service; operating economies; accident prevention; traffic congestion; development of freight business, and the reduction or elimination of unfair tax burdens. At the outset one of the important functions of the committee was the exchange of ideas and the dissemination of information regarding modern methods, made possible by visits of key men or field men of these committees to the various properties.

As a result of its survey the committee is now publishing a handbook in which will be found brief descriptions of modern methods of management and operation of electric railways in use here and there in the industry, but which may be applied on almost any property in the country and should eventually become standard practice when this influence is felt.

The regional directors outlined at their meeting held during last November the procedure for this year's activities. This program will be reviewed and plans made for field work at the meeting in Indianapolis.

In following the procedure outlined by the regional directors who constitute the advisory committee, it will be the duty of the members not only to disseminate the information collected in past years through the use of the Handbook on Modern Methods but also to collect additional information of a similar nature. Acting for Lucius S. Storrs and President Coates, members will seek suggestions as to the outstanding things that should be done by the association for the improvement of conditions in the industry. When deemed advisable the managers of properties visited may arrange for

interviews between members of the committee and representatives of the public press. Executives will be urged to make greater use of their state committees for the dissemination of public utility information. Members will attempt while visiting executive and department heads to acquaint them more intimately with the activities of the association headquarters.

At the request of the executive committee this year the committee on management and operation is planning to co-operate with the committee on education by carrying to the properties visited its message pertaining to industrial education. This message is designed to set forth the value of employee educational work, as distinguished from employee training, and to outline the preliminary and practical steps necessary to start educational work on an electric railway property.

The committee on management and operation has been enlarged this year to 63 members, with a view to having a sufficiently large personnel to enable its representatives to visit again each of the 137 companies reached last year and in addition as many more as possible, either members or non-members, of the association.

R. F. CARBUTT,

Chairman Committee on Management and Operation.

Ministry of Transport Authorizes 1½d. per Passenger-Mile

NOTTINGHAM CORPORATION TRAMWAYS

NOTTINGHAM, ENGLAND, Jan. 11, 1926.

To the Editor:

In the abstract of my recent paper on fares, published in your issue of Dec. 26, there is a typographical error on page 1118 in the reference to the fare authorized in the model clause for tramway undertakings of the Ministry of Transport. The figure should have been 1½d. and not 1d. per passenger-mile. As corrected the sentence will read:

In certain special acts promoted recently in relation to tramway undertakings, a Ministry of Transport model clause has been inserted, authorizing charges at the rate of 1½d. per passenger per mile.

A. A. JACKSON,

Technical Assistant.

Footing the Bill for Car Improvements

Jan. 20, 1926.

To the Editor:

I note in the Jan. 16 issue of the JOURNAL that a new committee has been appointed to study comfort and appearance of cars. It strikes me that the committee will not get much further than the noise committee did last year. That committee submitted a lengthy report at the last convention, but no one at the meeting took enough interest in it to discuss it either pro or con. So it looks to me like "love's labor lost." It is all very well for a lot of engineers to theorize and say that we should do thus and so to bring our cars up to a certain standard. But how are we going to get the money to do it? When we have to run everything to the limit and then some, to keep our expenses down, how can we afford to add the frills? Down our way we have run out of our supply of Aladdin's lamps, and unless the committee can scare up some new ones it cannot sell its wares.

Personally, I feel that our cars should be kept more quiet and should be improved as to comfort and convenience, but until our road earns more money and is in a position to spend some of it on equipment it looks like a hopeless task.

MASTER MECHANIC.

Association News & Discussions

International Tramway Convention in Barcelona

Program Just Issued for Convention of International Association to Be Held in Spain in October

BARCELONA, SPAIN, has been selected for the twentieth international convention of the Union Internationale des Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles, with headquarters in Brussels, to be held this year. An invitation was received to go to Barcelona from the Mayor of that city. The convention will be held there during the first half of October. The program for the technical sessions of the association follows:

1. *City Planning*: A study of the three conclusions reached by Mr. Delavenne in his paper at the Paris convention of 1924 on the place of the public carrier in city planning. (a) Local city transportation systems assist in distributing the population of a city, in encouraging the movement out from the center, and in increasing to some extent the ability of the city to gain inhabitants. (b) Transportation lines are also most helpful in building up undeveloped territory, but their routes in such districts should be laid out under the direction of an impartial and disinterested commission. (c) Transportation lines should seek to supply a service providing a maximum of speed, consistent with the physical and other limitations present, and capacity at all times, so far as it can be done with economy in operation and first cost.

The speakers on subject No. 1 are Mr. Jayot, inspector-general of local transportation in the Prefecture of the Seine, Paris, and Mr. Delacroix, engineer of the Barcelona Tramways.

2. *Publicity and Other Methods to Reduce Accidents*.

Speaker—Mr. Junyent, chief of service, Barcelona Tramways.

3. *The Economic Situation*. Percentages of the total operating expenses caused by the principal items of expense (wages, power, maintenance, etc.) and percentages of the principal items making up operating revenue in the different countries from 1914 to 1925. Effect on the local transportation industry of the general economic situation. Possibility of the determination of an economic index applicable to variations in fares.

Speakers—Messrs. L. Boule, manager Compagnie Générale Française de Tramways of Paris; Bouteau, manager of the Compagnie Générale des Chemins de fer Vicinaux of Paris, and Haerens, manager of the Consolidated Railway of Belgium.

4. *Merchandising of Transportation*. Facilities supplied in the way of (a)

scheduled speeds; (b) distances between stopping points and method of marking stopping points; (c) special methods to speed up service economically during the rush hours.

Speaker—P. Mariage, manager of transportation of the Paris Tramway System.

5. *Standardization of Electric Railway Motors*.

Speakers—Mr. Peridier, director of research Paris Tramway System, and Roman Podoski, professor at the technical school at Warsaw.

6. *Track Switches*. Switches of the automatic type and other switches operated from a distance on electric railway lines, particularly those with high traffic density.

Speakers—Mr. Battaille, manager of the engineering department Liège Tramways, and Mr. Stoffels, chief engineer of the Amsterdam Municipal Tramways.

7. *Power Distribution*. Results from automatic substations, substations controlled at a distance, and mercury-arc rectifiers.

Speakers—Mr. Lombard-Gerin, general manager Omnibus & Tramway Company of Lyons, and Mr. Odermatt, engineer of Brown-Boveri & Company, Inc., Baden.

8. *Rail Motor Cars*.

Speakers—J. De Croes, manager Société Nationale des Chemins de fer Vicinaux of Brussels; F. Level, manager Compagnie Générale des Voies Ferrées d'Intérêt local of Paris, and Commander Mellini, chief inspector for the government of railways, tramways and automobiles in Italy.

9. *Ties*. The results obtained during and after the war with substitute ties, notably those of steel and concrete.

Speaker—Mr. Burton, chief engineer on track to the management of the Société Nationale des Chemins de fer Vicinaux of Belgium.

10. *Buses and Bus Operation*. Design of bus bodies, including dimensions, arrangement of seats, steps, facilities for handling baggage; chassis, springs, tires, and other equipment.

Speakers—M. Chauchat, manager of the Société Industrielle de Transports Automobiles of Paris, and J. De Croes, manager Société Nationale des Chemins de fer Vicinaux of Belgium.

COMING MEETINGS

OF

Electric Railway and Allied Associations

Jan. 26-29—Society of Automotive Engineers, Annual Meeting, Detroit, Mich.

Jan. 27—New York Electric Railway Association, Hotel Commodore, New York, N. Y.

Jan. 28-29—Central Electric Railway Association, Lincoln Hotel, Indianapolis, Ind.

Feb. 5—Metropolitan Section, American Electric Railway Association, Engineering Societies Building, 29 West 39th Street, New York, N. Y., 8 p.m.

Feb. 11—Central Electric Railway Master Mechanics' Association, Portage Hotel, Akron, Ohio.

Feb. 18—A.S.C.E., A.S.M.E., A.I.E.E. and A.I.M.M.E., joint meeting, Engineering Societies Building, New York, N. Y., 8:15 p.m.

Feb. 24-26—Electric Railway Association of Equipment Men, Southern Properties, Mobile, Ala.

March 8-11—National Railway Appliance Association, annual exhibition, Coliseum and Annex, Chicago, Ill.

March 17-18—Illinois Electric Railways Association, Illinois State Electric Association and Illinois Gas Association, annual joint convention, Springfield, Ill.

April 13-16—Southwestern Public Service Association, Galveston, Tex.

Unification of Wire and Sheet Metal Gages Proposed

THE American Engineering Standards Committee has been requested by the Society of Automotive Engineers to take up the unification of wire and sheet metal gage systems in order to arrive at a national standard system of designating the diameters of metal wires and the thicknesses of metal sheets. The systems of gage numbers by which these products are generally designated at present have been developed and adopted in the course of time in different trades and for different products, as steel and copper wire, aluminum, brass and zinc sheets, etc. Thirteen gage systems are now in use in this country. This wide diversity necessarily leads to confusion. Some organizations, in order to avoid such confusion, have done away with gage numbers entirely and designate wire and sheet metal sizes exclusively in decimal fractions of an inch.

A conference of all industrial groups interested in this problem will be called in the near future, to discuss the desirability and possibility of unifying the various existing gage systems into a consistent national system or systems. A question closely connected with that of the designation of wires and metal sheets is whether or not it is feasible to thin out the series of diameters or thicknesses actually listed in the catalogs of the different trades. Inasmuch as a procedure of this nature involves the element of "simplification," the A.E.S.C. and the Division of Simplified

Practice of the Department of Commerce have made arrangements to co-operate actively in this matter. The latter body will undertake to bring about production surveys in the trades concerned, in order to find out the relative importance of wires and sheets made to the several gage numbers.

Oklahoma Utilities Choose Tulsa for 1926 Meeting

TULSA has been selected for the eighth annual convention of the Oklahoma Utilities Association. It will be held at the Mayo Hotel, March 9, 10 and 11 next. This announcement was made by E. F. McKay, manager of the association, at the conclusion of the quarterly meeting of the executive board held recently. Extensive exhibits by manufacturers of public utility equipment will be an important feature of this convention.

Illinois Utilities' Joint Convention

ON WEDNESDAY and Thursday, March 17 and 18, 1926, the sixth annual joint convention of the Illinois Electric Railways Association, the Illinois State Electric Association and the Illinois Gas Association will be held in Springfield, Ill.

A program of interest to every branch of the utility industry is being prepared. As in the past, there will be joint morning sessions and separate afternoon sessions for each association. The joint sessions and all railway association sessions will be held in Hotel Abraham Lincoln.

Applications have been made for reduced railroad fares. If these are granted identification certificates, acceptable over the Illinois Traction System as well as over the steam roads, will be sent out with the programs, which will be available about March 1.

Diesel Electric Locomotive vs. Electrification

Possible effects of the Diesel electric locomotive on heavy electrification will be the subject of an important meeting to be held on Feb. 18 at the Engineering Societies Building, 33 West 39th Street, New York.

The meeting is to be held jointly by the Metropolitan sections of the A. I. E. E., A. S. C. E., A. S. M. E. and A. I. M. E. The principal speakers of the evening will be C. B. Stein, general manager Central Railroad of New Jersey; Hart Cook of the MacIntosh & Seymour Corporation and N. W. Storer of the Westinghouse Electric & Manufacturing Company.

they had in Los Angeles in regulating pedestrian traffic. He also stated that automatic traffic signals were working very satisfactorily in Los Angeles and speeding up all traffic. Mr. Evenson recommended that a number of talking points along the line of traffic elimination be taken up and if possible "sold" to the public, such as the number of passengers carried on the cars as compared with automobiles, etc.

Chairman Meyers appointed Mr. Greig a committee of one to get a report of all cities that have had traffic surveys made.

Mr. Fennell stated that in securing a motor coach franchise for three years from the city for the Kansas City Railways the number of stops per mile and designated loading zones had been incorporated in the franchise. He suggested that all companies figuring on securing franchises in the future incorporate this idea, as it does away with all unnecessary stops and thus speeds up the schedules.

Mr. Anderson suggested working along the lines of getting a law compelling drivers of all commercial vehicles to pass a test before being allowed to drive. He stated that if a test of this kind would be required better men would be on commercial vehicles, and this would go a long way toward relieving traffic congestion.

Mr. Greig recommended the adoption of a standard traffic code. Mr. Evenson suggested that the committee come back to the next meeting with some concrete ideas on a standard traffic code. Mr. Fink suggested that some thought in the making of this code be given to cruising taxicabs.

Chairman Meyers suggested that each member of the committee draw up a set of traffic rules, and use as far as possible the recommendations of the Hoover committee; that he thought it would be of benefit for each company to try to organize in its city a committee to work with the company in the adoption of rules for the purpose of regulating traffic.

The next meeting will be in Cleveland on April 2.

Members present were: A. R. Meyers, chairman; G. B. Anderson, J. A. Greig, C. H. Evenson, R. W. Emerson, J. P. Pope, D. L. Fennell, A. J. Fink and J. P. Tretton.

Steel Industry in Movies at Next Metropolitan Meeting

STEEL, the giant industry, will be the subject for the next meeting of the Metropolitan Section, A. E. R. A., to be held at the Engineering Societies Building, New York City, at 8 p.m. on Feb. 5. G. A. Richardson, manager technical publicity department Bethlehem Steel Company, will give the address on this subject, which will be illustrated by several reels of motion pictures.

Entertainment features that will follow will be provided by employees of the Third Avenue Railway system.

The usual Dutch-treat dinner, which has become a feature in connection with the monthly meetings of the Metropolitan Section, will be held at Keene's Chop House, 36th Street east of Sixth Avenue, beginning promptly at 6:15.

American Association News

Traffic Congestion

WAYS by which the electric railways can help in the solution of the serious problems of traffic congestion were discussed at a meeting of the committee on traffic congestion, held at the Statler Hotel, St. Louis, Mo., on Jan. 8. Communications on traffic congestion from R. W. Emerson, C. H. Evenson, H. J. Lockwood, W. E. Thompson, G. B. Anderson, J. A. Miller, Jr., J. A. Greig, E. S. Rider, R. B. Hill (supplementing Mr. Anderson's communication), A. W. Brohman and W. H. Maltbie were read.

Mr. Fink of the Pittsburgh Railways told the committee of conditions in Pittsburgh and of the success of efforts to secure co-operation from the city traffic committee, which worked with the company to eliminate traffic congestion, accepting in a great many cases the recommendation of the traffic engineer of the Pittsburgh Railways.

D. L. Fennell briefly outlined the conditions in Kansas City, and recommended that efforts be made by the committee to get outside influences, such as the Hoover committee, to co-operate with the committee. G. B. Anderson, in discussing Mr. Fennell's remarks, stated that national organizations interested in traffic congestion would co-operate with this committee, and spoke very interestingly of the conditions in Los Angeles and the success that Los Angeles has had with the Property Owners' Association.

C. H. Evenson briefly outlined park-

ing conditions in the Loop district in Chicago, and stated that his company had not pushed the "No Parking" idea and would not do so until the public had been educated to the benefits to be derived from "No Parking" rules. He also stated that by rerouting cars and eliminating left-hand turns a wonderful improvement had been made in traffic congestion, and cars had been speeded up a great deal in the congested area. He told of the success of the efforts of his company in working with the Chamber of Commerce, and recommended that the committee work out a standard traffic code.

S. W. Greenland, representing the United Railways of St. Louis, outlined the plans that the company has worked out, and also spoke of a further plan of one-way streets that will soon be submitted to the city traffic authorities, which, he stated, would be of great benefit in eliminating traffic congestion on the streets of St. Louis. He stated that the city of St. Louis has a central traffic committee composed of three officials. Mr. Greenland also told of the efforts of the railway to educate property owners as to their loss by the decentralization of business. Talks along this line were also made by Messrs. Anderson and Evenson in discussing Mr. Greenland's remarks.

It was decided that the committee should get in communication with the Hoover committee, calling its attention to the activities of the A. E. R. A. committee.

Mr. Anderson outlined the success

Maintenance of Equipment

Good Drainage Necessary at Interurban Car Stops

SOILS of all kinds with a variety of drainage problems are encountered by the Pacific Electric Railway on its interurban system. This company operates more than 1,100 miles of electric interurban lines and has approximately 1,500 car stops. As explained by Clifford A. Elliott, cost engineer for the company, the landings at stops are placed on each side of the track and are



Corrugated Iron Culvert Installed Under Passenger Landing at Vineyard Station of the Pacific Electric Railway

located over drainage ditches adjacent to the roadway. It is thus frequently essential to provide longitudinal culverts under them to care for proper removal of water.

Years ago, when some of these landings were first built, many redwood box culverts were installed. The life of these culverts averaged about five years, and the company tried other methods of construction in order to secure longer life. For the past fifteen years the company has used Armco corrugated iron culverts, particularly where a large amount of water had to be carried away, and where the damage that might result from inadequate drainage would be great. The corrugated iron culverts used average from 12 in. to 18 in. diameter and extend the full length of the landings, which are from 75 ft. to 350 ft. long. To carry out the effect of a standard landing construction, cobble-stone end retainers are provided. The quarry waste material in the land-

ing, being white in appearance, can be readily observed by trainmen when approaching the landing at night. The end retainers are also whitewashed to carry out the light effect. This construction is proving satisfactory and economical.

Pull-Ins Compared for Southern Properties

COMPARATIVE statements of car pull-ins for the twelve months ended December 31, 1925, have just been compiled by the Electric Railway Association of Equipment Men, Southern Properties. These show a total of 6,832 pull-ins for all causes, of which 4,655 were chargeable to equipment. Car-miles operated by the twelve companies comprising this association total 80,850,977. Average car-miles per chargeable pull-in for all companies were 17,350. The highest mileage per chargeable pull-in was recorded by the New Orleans Public Service, Inc., as was also the case for the year 1924. Second place went to the Nashville Railway & Light Company. A comparison of the pull-in records of the electric railways in the twelve cities is given in an accompanying table.

COMPARISON OF COMPANY RECORDS

Company	Car-Miles	Total Pull-Ins	Chargeable Pull-Ins	Car-Miles per Chargeable Pull-In
New Orleans.....	15,060,906	232	79	190,644
Nashville.....	5,499,214	145	44	124,982
Knoxville.....	2,678,720	128	68	39,246
Memphis.....	7,482,110	571	391	19,136
Birmingham.....	11,271,437	869	726	15,525
Atlanta.....	13,093,604	1,071	760	17,228
Mobile.....	2,113,361	211	152	13,904
Texas Electric.....	5,654,158	574	407	13,892
Little Rock.....	2,787,415	289	216	12,905
Covington.....	3,899,801	538	270	14,444
Dallas.....	8,916,818	1,365	914	9,756
Chattanooga.....	2,393,433	839	628	3,811
All companies.....	80,850,977	6,832	4,655	17,350

Reports compiled by the association show also the causes of pull-ins. For the year just ended the largest number, 1,258, resulted from failure of car wiring and control apparatus. Under this head are included circuit breakers, line breakers, controllers, contactors, relays, headlights, lighting fixtures, lightning arresters, electric bells, trolley wheels, rheostats, motor leads, cables and field jumpers. Next in point of number were the failures of armatures, armature shafts and armature bearings, totaling 1,036. Brakes and brake riggings were responsible for 769 failures. Miscellaneous troubles with car bodies, seats, heaters, etc., caused 501 pull-ins. Wheel, gear, truck, axle and journal failures numbered 402. Failures of motor fields numbered 394. Commutators, brushes and brush-holders were responsible for 295 failures.

Cars pulled in on account of derailments, broken doors, broken glass or accidents are classified as being chargeable to transportation rather than to equipment and are not listed as chargeable pull-ins. A summary of the causes of chargeable pull-ins on these Southern properties is given in an accompanying table.

SUMMARY OF CAUSES OF PULL-INS

	New Orleans	Nashville	Knoxville	Memphis	Birmingham	Atlanta	Mobile	Texas Elec.	Little Rock	Covington	Dallas	Chattanooga	Total
Armatures and armature bearings.....	20	12	11	105	234	186	31	63	16	64	184	110	1,036
Commutators and brushes.....	1	5	0	54	33	63	3	37	5	3	53	38	295
Fields.....	9	2	0	21	141	83	18	11	16	15	48	30	394
Car wiring.....	17	12	32	82	109	231	40	145	69	75	291	155	1,258
Wheels, gears and trucks.....	9	3	3	24	102	80	11	35	25	14	37	59	402
Brakes and brake rigging.....	23	8	18	30	59	95	30	70	67	39	199	131	769
Car bodies.....	0	2	4	75	48	22	19	46	18	60	102	105	501
Total.....	79	44	68	391	726	760	152	407	216	270	914	628	4,655

Improvements in Old Type Motors*

DECREASED maintenance has been effected through a number of changes made in construction details of old type motors operated by the Denver Tramway, Denver, Col. Some motors had the ventilation intake at the bottom of the motor shell and trouble was experienced from dirt, leaves and snow being drawn inside it. A new duct has been welded on the outside of the shell so that air is taken in at a higher point. This has decreased short circuits and increased the life of carbon brushes practically 300 per cent.

Armature bearings of the old style had end cover plates fastened on with three screws. These were a source of considerable trouble due to their working out and permitting water and dirt to enter to bearings. Bearings were destroyed and armatures rubbed on the pole faces so as to require rewinding. This condition has been remedied by casting these bearings with a hole tapped for $\frac{3}{4}$ -in. brass pipe plugs. With this arrangement the loosening is prevented.

Some old-style General Electric type 58 motors had field coils wound with round wire. The insulation had become baked and the fields short circuited so as to require scrapping. Field coils are now wound with a flat copper ribbon insulated between turns with asbestos tape, in the most approved manner. When a field wound in this manner becomes short circuited it may be rewound and the same copper ribbon can be used indefinitely.

On many of the old-style motors the field terminals were attached to the winding through a piece of flat copper soldered to both terminal and the field winding. This strip gave considerable trouble due to breakage, and to remedy this a strip of flexible copper braid is now used to attach the terminal to the field winding.

Brush-holders on some of the old-style motors were fitted with non-adjustable tension springs so that when the spring weakened a new one was required. A new brush-holder casting has been designed so that a modern adjustable coil spring with hammer can be used and proper tension is maintained at all times.

On some armatures the connections for the bottom leads from the coil

are brought out straight to the commutator. Vibration caused considerable breakage in these leads. This trouble has been almost entirely eliminated by placing a bend in the bottom lead before attaching it to the commutator. This allows for expansion and contraction and relieves the strain on the wire.

Fiber Plates Keep Tension on Armature Wire

SIMPLICITY is the outstanding feature of a device arranged in the Albany Street shops of the Boston Elevated Railway to keep tension on the wires used in winding



Armature Winding Wires Pass Between Fiber Plates Bolted to the End of a Wooden Arm

armature coils. Two flat fiber plates are attached to the outer end of a wooden arm extending from the winding bench toward the wire reels. The wires pass between the plates. The latter are held in position by a pair of bolts which pass through the wooden arm, the plates, and a wood block which rests on them. By tightening the nuts on these bolts the fiber plates are brought close together and greater tension is secured in the wires.

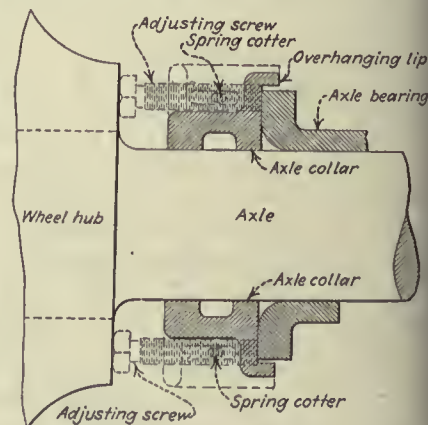
Keeping Motor End Play to a Minimum

MAXIMUM allowable end play of railway motors should be from $\frac{1}{4}$ in. to $\frac{3}{8}$ in. These limits are desirable since, if they are exceeded, the gear may rub and cut the inside of the gear case, and these figures for end play correspond to the average clearance between the gear and inside of the gear case on standard types of railway motors. Since the axle collar limits the end movement of the motor, it is naturally subjected to wear. Checking of the amount of motor end play is therefore a neces-

sary part of motor inspection. If axle collars are neglected and adjustments are not made at regular inspection periods the end play becomes excessive and the motor is subjected to excessive side movement and pounding. This is particularly noticeable when the car is rounding a curve or running on rough tangent track.

Axle collars are made of several different types, and as a result several different methods for taking up the wear are used. Probably the most general method is to take up the end wear on axle bearings by means of split rings, either of iron or of hard fiber. These rings are

made of different thicknesses, and when opened up are forced over and around the axle, between the collar and the wheel hub. Babbitt metal has been used by some railways instead of using the metal or fiber



Section Through Adjustable Axle Collar

rings. This has proved very satisfactory, but of course requires the removal of the axle collar for babbitting.

In order to provide a positive and permanent means of taking up the end play on axle collars due to wear an adjustable type has been de-

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

veloped by the Westinghouse Electric & Manufacturing Company. The accompanying drawing shows this type of axle collar in its location on the car axle. This type of axle collar is provided with two adjusting bolts, the heads of which are backed up against the wheel hub. These bolts can be backed off the distance necessary to make the collar long enough to take up the maximum allowable axle bearing flange wear, after which the worn bearings should be replaced by new ones.

On some types a dust-protecting, overhanging lip is used. This affords a protection against the entrance of dust and dirt on to the rubbing surface of the axle collar and the axle bearing flange. This protection reduces the wear at this point and consequently lengthens the life of the bearing. Some operators have objected to this lip as it interferes with the removal of the motor from the car axle. Removal, however, can be carried out satisfactorily if the

work is done in the following order: (1) Remove the pinion and axle; (2) remove the lower half of the pinion end axle bearing; (3) remove the top half of the pinion end axle bearing; (4) shift the motor on the axle against the gear, and (5) remove the commutator end axle cap and bearing without disturbing the axle collar.

Circuit Breaker Testing

A NEAT circuit breaker testing outfit is a part of the equipment of the Beaverton, Ore., shops of the Southern Pacific Company. It includes the necessary switches and panels mounted on a platform with wheels. Two Edison A-12 storage-battery cells furnish 600 amp. at 3 volts and can provide a 500-amp. discharge for two minutes. The usual type of resistance proved unsatisfactory so a carbon resistance pile is now used, and this gives extremely small graduation of the current.

angle greater than 50 deg. The body is under positive control in all positions and may be held at any angle. It is lowered by the same mechanism that hoists it, but can be lowered while the truck is in motion.

The body is mounted so that load weight is properly distributed and the dumping point is far back. A double-acting tail gate facilitates dumping and the low-body sides make loading from the ground exceptionally easy. The dumping mechanism is set solidly down in the frame in a dirtproof and weatherproof housing. The gears run in oil.

The wheelbase of the model 52-D is 156 in. It has solid tires, 36x6 front and 40x12 rear.

Aluminum Graphite Paint

RECOMMENDED particularly for use wherever a light colored paint is required, the Joseph Dixon Crucible Company, Jersey City, N. J., has just brought out an aluminum graphite paint. It is composed of aluminum and flake silica-graphite as a pigment and boiled linseed oil as a vehicle. The aluminum is of flake formation and thus combines easily with the flake graphite. These flakes lapping over like fish scales provide a covering of unusual elasticity and durability. The combination of aluminum and graphite results in a paint that, it is said, is not affected by gases and fumes. It resists sunlight, air and moisture and its reflecting qualities keep temperatures of cars considerably lower than is possible with darker paint.

New Equipment Available

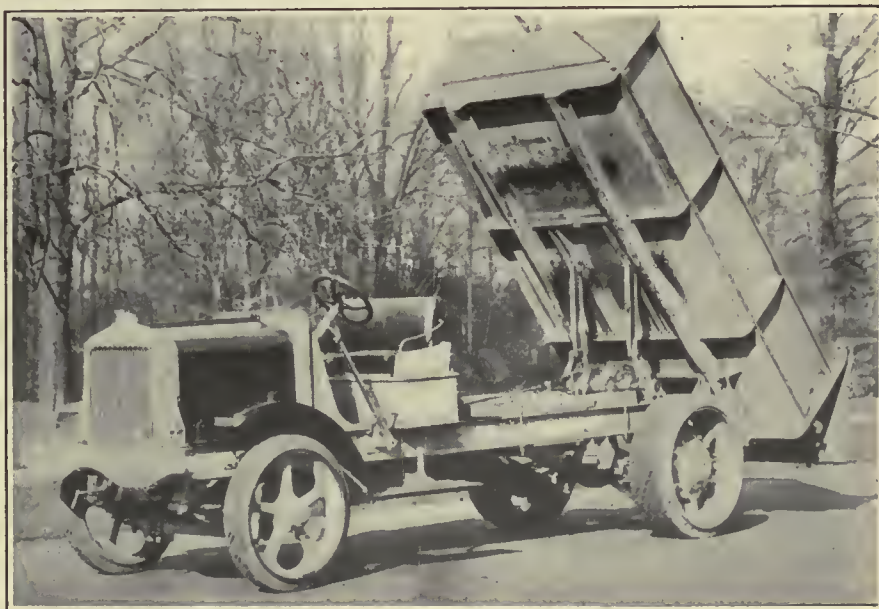
Tapered Body, High Angle Dump Truck

GREATER speed and safety in dumping sticky loads, combined with an auxiliary five-speed transmission, gives extra power and flexibility to a new heavy-duty dump truck built by the White Company, Cleveland, Ohio. The new model 52-D has an auxiliary transmission affording the equivalent of five speeds and gives extra low-gear pulling power for high hill climbing and getting out of holes or mire. A new dumping mechanism and tapered dump body are other improvements which are combined with a big sturdy tubular type radiator; spring cradles on the frame; a wide, heavy pressed-steel bumper; heavy easy-working steering gear; an air temperature regulator that saves fuel and adds to engine efficiency in all seasons; heavy springs; reinforced frame of chrome nickel steel, and brakes with drums of a special metal that insure quick, certain stopping and long brake life.

The auxiliary transmission gives maximum flexibility of power. It enables the driver to gear down to the hardest pull when it is needed, and it allows the main transmission to work at a higher top speed on the

level. Power is transmitted in a straight line from the starting crank to the rear axle when operating under load.

Incorporated in the same case with the auxiliary transmission is the mechanism which operates the dumping hoist. The tapered dump body is raised on sturdy arms and links by means of a gear drive. It lifts to an



A High Dumping Angle with Improved Hoist Mechanism Are Features of the New Heavy-Duty Dump Truck

The News of the Industry

Rochester Road to Operate Line in Abandoned Canal Bed

That the New York State Railways eventually will operate the subway rapid transit and industrial railroad in the bed of the abandoned Erie Canal in Rochester, N. Y., is indicated.

At a conference held recently of the Citizens Committee, named by Mayor Van Zandt to study the operation of the new line, with James F. Hamilton, president of the railways, Mr. Hamilton was asked to submit to the committee figures on the sum the company would pay the city for its use.

Payment was to be figured, it was said, on a car-mile basis for each car, both interurban and city, as well as freight cars.

This step was taken to mean that the committee on receipt of the railway's figures would recommend lease of the subway railroad to the traction company.

The 8-mile line from the west end of Rochester to the eastern limits, constructed by the city, is virtually completed and much speculation was aroused as to its operators.

The report of the committee is expected to be submitted to the Mayor in the near future.

Terminal and Transportation Plan Outlined for Newark

The Pennsylvania Railroad, the city of Newark and the Public Service Corporation of New Jersey have recently reiterated their willingness to enter upon a program for the expenditure of \$25,000,000 for the erection in Newark of a new union terminal and the laying of a vast network of high-speed surface lines, linking northern and western New Jersey with Newark as the natural gateway to New York.

The plans in detail contemplate the abandonment of Manhattan Transfer, the extension of the Hudson Tube system to southern sections of Newark, three double-track steel bridges over the Passaic River to accommodate increased traffic brought about by the transfer from electric to steam locomotives at Newark, and the erection of a Pennsylvania passenger station and steam terminal at Wright Street, in the down-town section of Newark.

Thomas W. Hulme, vice-president of the Pennsylvania Railroad in charge of real estate, has sent a letter to Mayor Raymond of Newark, asking that official to name a committee to go into conference with the railroad committee.

The railroad, Mr. Hulme said, has \$12,000,000 ready for expenditure, while it is estimated that Newark and the three arms of the Public Service system will each share in the expenditure of an additional \$13,000,000. Transportation systems involved in the

plan include steam and electric railway lines, electric surface and subway lines and buses.

The Public Service Railway and railroad branches have the most definite transportation plan outlined for them. This includes, first, a high-speed surface line into north Jersey and the west of Essex County for the feeding of passengers into the Newark Terminal. Considerable rerouting of surface car lines will also result when the terminal is built.

Rerouting Plans for Detroit

Car rerouting plans affecting three major street car lines in the downtown district of Detroit have been presented to the City Plan Commission by the Department of Street Railways. Under the proposed plan, Grand River and Hamilton cars would be turned south at West Park instead of Griswold Street and Woodward Avenue, the Grand

River-Jefferson cars going over West Park, State and Griswold Streets south to Jefferson Avenue, and Grand River-Capitol Park cars turning north on the east side of Capitol Square Park. The Hamilton cars would also follow this latter route, thus taking them off Woodward Avenue. The new routings are planned to relieve congestion around Capitol Square Park and facilitate traffic movements.

Two lines of tracks are proposed in place of the one now on the east side of Capitol Square Park between State Street and Grand River Avenue, with loading platforms on the east side of the park. Subway walks from the loading platform to the east side of Griswold Street are proposed to provide easy ingress and egress. This will give a wider thoroughfare for vehicular traffic, minimize interruptions to traffic and provide safety for the car riders who board cars or disembark at this point.

New Grant for St. Louis Discussed

Mayor Outlines Fundamentals He Believes Should Be Incorporated in New Operating Grant—Company Favorable to Mayor's Service-at-Cost Suggestions

VICTOR J. MILLER, Mayor of St. Louis, Mo., has outlined the requirements he believes should be incorporated in any new franchise granted by the city to the St. Louis Public Service Company, as the United Railways will be known when the reorganization is finally consummated. The Mayor stated he would insist that the franchise be submitted to the citizens under the initiative or referendum provisions of the city charter.

In his brief the Mayor favors co-ordination of service (presumably of buses and street cars); the right of the city to determine the kind and character of service to be rendered at cost; the right of the city to acquire the property if it should desire to operate the transportation system or have some agency other than the company operate it; and the adoption of a service-at-cost plan that will insure a fair return to the investors in the company. After reviewing the place which adequate transit plays in city development the Mayor says in part:

The citizens of St. Louis do not expect to receive something for nothing, but they do expect their money's worth. The city will require that any company operating its transportation services shall invest large sums of money in extending and improving that service. If such money is to be secured through private investment, it can only be secured if the investor is given a fair assurance of interest on his investment and its ultimate return to him. Any ordinance which the city may promulgate and which in our opinion will assure the best service at the minimum cost to the users should originate from or be submitted to the people.

Operation must be carried on pursuant to the terms of a new modern and up-to-date

franchise. I intend to cause an ordinance to be drafted that will protect the city and its citizens. This ordinance should be submitted to the people of St. Louis for their approval. Any company which wishes to operate in St. Louis must comply with all its terms.

I favor a franchise which would give the city the right to determine the kind and amount of service to be rendered at cost. I favor a co-ordinated service to eliminate waste. The city must have the right to acquire the property, in case it should desire itself to operate the system or to cause it to be operated through some other agency. The investor should be given reasonable assurance of a fair return on his investment. Not only must the city be entitled to prescribe the kind and amount of service which is to be furnished, but it must give careful thought to the means of permitting such service to be efficiently operated. Mass transportation is essential.

This administration is making a careful study of the traffic situation. To some extent we can profit by the experience in other cities. Any transportation company operating in St. Louis must be willing not only to conform to such traffic regulations as may be promulgated, but must also spend such sums as will be necessary to rearrange and reroute its cars.

Transit by subways or elevated must come in the future, and the work of planning and laying out the transportation system so that it will facilitate such development must be started now. In the meantime, however, we can accomplish much, both as to speed and amount of transportation service, by properly regulating traffic.

As soon as possible there will be submitted to the St. Louis Public Service Company certain fundamental propositions which the city will insist must be a part of any ordinance submitted.

J. K. Newman of Newman, Saunders & Company, in charge of the United Railways reorganization, was in St. Louis on Jan. 18. In commenting on Mayor Miller's statement he said that he was satisfied with the Mayor's declaration. He agreed that any fran-

chise should be submitted to the people for a final vote.

A statement about the matter, approved by the reorganization committee of the United Railways, follows in part:

In general, the views of Mayor Miller are acceptable because they represent a modern policy which has prevailed in many of the largest cities in the settlement of the difficult problem of establishing transportation on a sound basis.

Perhaps the most important feature of Mayor Miller's program is the adoption of the service-at-cost system. In short, this means that the value of the property established by the State Public Service Commission must be accepted by the company as the agreed value of the railway system. On such valuation the company will be allowed to earn only a fair rate of return and no more. No private business enterprise in St. Louis could accept such limited and restricted right to earn, but the company recognizes the trend of the times and will accept what has been adopted as a fair policy in other cities.

The interest of the public requires that the new franchise should become effective at the earliest possible moment so that the receivership may be terminated. Publicity should be given to each and every point involved. If the public desires that the franchise should be approved by the people at the polls, then the city authorities should so provide, even though such procedure would involve added delay and expense.

The fare to be charged under a service-at-cost franchise will depend entirely upon the kind and character of service. A railroad traveler cannot ride in a Pullman car at the price paid in a day coach. The company again indorses Mayor Miller's policy that the character of service should be controlled by the city and the car riders. Such service should not be inferior to the best service in other large cities merely to keep the fare at too low a level, nor should it be so extravagant that it will necessitate a fare beyond the wishes of a majority of the patrons.

The city can do much to keep the rate of fare down by not imposing on car riders unnecessary burdens of taxation, street paving, franchise assessments, licenses and other charges entirely controlled by the city. These charges now imposed by the city and collected from car riders constitute a part of the fare charged. If these burdens are not placed upon the car riders, they and only they get the benefit thereof, as under the service-at-cost system the company, for the life of the new franchise, will be confined to a limited return on the valuation of the property fixed by the Public Service Commission.

The company must have the fair return on investment, since it cannot procure from investors the large sums necessary to provide for better service unless such investors are given a fair assurance of interest on their investment and ultimate return of capital. No transportation company can succeed without the confidence and support of the city, the public and the press.

Service Survey Suggested in Milwaukee

Latest developments growing out of the Milwaukee Electric Railway & Light Company's commission-approved plan to install one-man cars on its Walnut Street line in Milwaukee, Wis., starting March 1 centers around a statement issued by S. B. Way, president of the company, in defense of the one-man car. Cars of this type are already in use on four lines in Milwaukee to keep down operating costs, but further economies in operation are necessary, according to Mr. Way, if the railway division is to earn the return on its investment allowed by law. According to Mr. Way earnings for the single-fare area reached only \$7,825,045 in 1925 in contrast with \$7,933,763 in 1924, a difference of \$108,718. In 1925 cars operated a total of 17,651,161 miles against 17,538,831 miles in 1924. As a move intended finally to put at rest any question about the adequacy of the service rendered the Railroad Commission has decided to survey the railway service situation.

Santa Claus in Safety Hall

Wives of Louisville Officials, Headed by Mrs. Barnes, Put Human Touch Into Railway

Of all places for old Santa to show up, isn't Safety Hall, Louisville, one of the most appropriate? Anyway, that is just what he did. More about that later. Safety Hall is one section of a building which for many years served as the shop of the Louisville Railway. In April, 1921, when the company was in need of a place of its own to celebrate the victory of safety over carelessness, this particular section of the old shop building was fitted out with a dining room, kitchen and lounge room, appropriately dedicated to the interest of safety. Each month since that time the victors in the railway's accident elimination contest have put their feet under the well-filled tables of Safety Hall.

Early in the fall of 1925 Mrs. James P. Barnes, wife of President Barnes, communicated with Santa Claus and exacted a promise from him that he would appear in person with a present for each child of every employee at a special Christmas party. With this important part of the program disposed of, Mrs. Barnes called to her assistance Mrs. F. H. Miller and Mrs. Samuel Riddle, the wives of the two vice-presidents of the company, and began the task of finding out how many children there were, their names, ages and sex, so that old Santa would not suffer the embarrassment of presenting a doll to some sturdy boy or an air rifle to a curly-headed little girl. Through the foremen of departments, the names, ages and sex of all children between the ages of one and twelve years were obtained and an appropriate toy was wrapped separately and the child's name placed on a package for each of the 1,200 children. Even if one's experience has been limited to purchasing, wrapping and marking only presents for the members of his own immediate family he can easily imagine the labor necessary to perfect the plans for the crowd which gathered at this tree.

Information from Santa to the effect that the Christmas rush would make it necessary for him to appear at Safety Hall on Dec. 21 and 22, the first day for white children, the second for colored children, started a large corps of willing workers making the necessary preparations to welcome him. The hall was beautifully decorated with evergreens and draped with icicles and snow. A Christmas tree reached to the ceiling. It was decorated with hundreds of sparkling ornaments and colored lights stood just inside the hall to bring forth exclamations of wonder from the happy kiddies as they entered.

In order to expedite distribution, the presents were placed in alphabetical order in bins along the wall, and when the crowds of happy youngsters arrived they found old Santa himself at the door to greet them and personally conduct them to one of his many assistants, who promptly placed their own present in their hands and invited them to eat all the ice cream cones they desired while looking at the tree or enjoying the warmth of the big log fire in the old-fashioned fireplace in the

lounge room before leaving for home.

Care was taken by the ladies in charge to see that any children who by reason of sickness or other disability were unable to attend the party received their presents at home. A surplus of toys was on hand in case any one had been overlooked. The leftover toys, of which there were quite a number, were divided equally between the children at the City Hospital and the Family Service Organization.

Awards Made for Station Names on North Shore Line

The nine stations on the new Skokie Valley route of the Chicago, North Shore & Milwaukee Railroad—the North Shore Line—were officially designated on the map recently when the committee of judges announced its decision in the \$1,000 award station-naming contest. The names of the stations with the winners of the nine \$100 awards follow:

Station No. 1—Harmswoods. Winner, Mrs. J. A. Barber.

Station No. 2—Glenayre. Winner, Ogden A. Clemens.

Station No. 3—Wau-Bun. Winner, Bertha F. Gordon.

Station No. 4—Northbrook. Winner, Northbrook Civic Association, Northbrook, Ill.

Station No. 5—Woodridge. Winner, Mrs. Marjorie M. Weese.

Station No. 6—Briargate. Winner, Bessie R. Alexander.

Station No. 7—Highmoor. Winner, Mrs. Gertrude C. Crane.

Station No. 8—Sheridan Elms. Winner, Mrs. Belle Falwell.

Station No. 9—Skokie Manor. Winner, Dorothy Shanderg.

Sheridan Elms was chosen by the judges as the most appropriate name among all those suggested. Mrs. Belle Falwell, who won with this suggestion for Station No. 8, was also given the special award of \$100 for this name. Checks for \$100 have been mailed to each of the persons suggesting names chosen for the new stations.

Each suggested name was judged on its practicability and simplicity, historical value and originality.

The judges complimented the North Shore Line on its progressive attitude in permitting the people of Chicago and the North Shore to have a voice in naming these new stations in the beautiful Skokie Valley, where, without doubt, within a very short time there will be a large population.

New Colors for Detroit Cars

A. L. Drum, engineer for the receivers of the Detroit United Railway, Detroit, Mich., has authorized a decided innovation in car coloring. The new Detroit United design is of stream-line effect and in the five principal colors. The body of the car is painted in desert sand color with mahogany sashes, old ivory posts, vermillion red roof and light gray trucks. Parts suspended under the car are in black and all trimming and striping are in black. In addition there is a 2-in. red band just below the window sashes. The Detroit United Lines' monogram appears on the sides of the car in azure blue with black border.

Skip Stops Suggested for Baltimore

The Baltimore Traffic Commission has received a recommendation from Kelker, De Leuw & Company, Chicago, experts making a traffic survey of Baltimore, that a skip-stop plan of operating the street cars be put into effect during the busy hours of the morning and afternoon. The report to the commission states that the stopping places average 10.22 in every mile of track as compared with slightly more than eight in Washington and Chicago.

The report said that widening of streets, though expensive, will be necessary in many cases if the time spent between home and office, store or factory is not to be greatly increased in the future. It is pointed out that meanwhile the time consumed in traveling can be reduced for the majority of the workers if some of the stops are eliminated during the morning and evening rush hours.

The question of rerouting the street cars, four plans for which have been prepared by the experts and submitted to the commission and upon which public hearings will be held, is being discussed by civic bodies.

Bacharach Bill Up Again in Washington

It is said that strong efforts will be made to persuade the House judiciary committee to order public hearings on the bill of Representative Isaac Bacharach of the Second New Jersey District to prevent appeals to federal district courts from rulings of state utilities commissions.

This bill, in substantially the same form, has been before two previous Congresses, but hitherto all efforts to get it reported out of committee have failed. Despite this fact, Representative Bacharach has hopes of getting a public hearing similar to the four that were held by a sub-committee in the 67th Congress in 1922.

Members of the federal judiciary have complained of the practice of public utilities, without appealing, as is their right, to the highest courts of their own states, of seeking injunction in federal courts to restrain utilities commissions from enforcing their own orders. As the law now stands injunctions may be sought in federal courts, without going to the highest state courts.

Riggs Report for Toledo Approved

The City Council at Toledo, Ohio, has unanimously indorsed the report of Prof. H. E. Riggs as the basis for negotiations with Henry L. Doherty for changes in the Milner franchise and new operating plans at Toledo. A copy has been sent to Mr. Doherty.

Since the report has been published an effort is being made to arouse public sentiment to back any settlement that may be made through the negotiations.

Through the invitation of the Chamber of Commerce a mass meeting was addressed by Prof. Riggs in which he emphasized the need for co-operation among the business leaders to help city

and company officials work out "a serious problem." He indicated that there were 5,250,000 riders a month on street cars and buses who must be served. He also pointed out that there was a franchise contract between the city and the traction company which should be carried out in order to keep the credit of the city good. He recommended that the grant be made flexible enough to serve the city and continue the contract through a co-ordinated street railway and bus system.

No Advance in Wages in Milwaukee Now

The request of employees of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., for a new and higher wage scale has been disallowed following a series of conferences between officials of the company and the Employees' Mutual Benefit Association, which conducted the negotiations for the employees. Settlement of the issue was influenced to a large extent when it was agreed that wage and cost of living conditions in Milwaukee were more than on a par with similar conditions in other cities that correspond in population to Milwaukee. Under the terms of the agreement reached, employees will continue to work until June, 1926, at the scale in force during the latter part of 1925. Conductors and motormen numbering upward of 1,000 of all grades in Milwaukee, Racine and Kenosha requested an advance of 5 cents an hour over the present rate of 50 to 61 cents an hour.

Mayor and Commissioner Discuss New York Transit

Mayor Walker of New York talked on the subject of transit before members of the Rotary, Lions, Kiwanis, Optimists, Exchange and Civitan clubs, assembled at a joint dinner at the Pennsylvania Hotel on Jan. 18. Among other things he said:

It is conferences of this kind that lead us out of the fog on this great question, a question that requires solution and requires it now. I have no fear of the political effect of taking counsel with you and I promise to take full advantage of any suggestions you may make.

Major-Gen. John F. O'Ryan, representing the State Transit Commissioner, said the question of transit was divided into two parts, one providing additional facilities and the other making better use of the facilities that now exist. Even should the Legislature grant a further exemption from the city's debt limit, this would take several years to become effective, so that the immediate problem was to make the best of present facilities.

To accomplish this he said the Transit Commission offered the plan for unified control, through a quasi-public corporation to be organized, of the more than forty existing transportation companies within the city. This plan, said General O'Ryan, received no consideration by the preceding city administration, but was the one plan that would eliminate waste and bring efficiency of operation. General O'Ryan suggested redistribution of the city's population, so that it would live nearer the places of employment.

Railway Cars Again Operate in London, Ont.

Service was resumed recently by the London Street Railway, London, Ont. after the tie-up ending after seven days. The relief came as the result of intervention by a group of business men. The Council insisted that the railway resume service before negotiations were further.

Steps will be taken to arrange a 60-day operation period at a 5-cent fare in the hope that during this period a definite permanent agreement can be made with the company. It is understood that the buses which have been operated are to be withdrawn soon for service elsewhere and that licenses will not be issued by the Police Commission for any more buses during the period of renewed agreement with the street railway. Elimination of the independent bus companies was demanded by the railway as the condition on which it would continue operation.

Engineers to Discuss Tube—P. R. T. Stock Increase Approve

Engineers of the Philadelphia Rapid Transit Company, Philadelphia, Pa. will discuss with Director Ehlers and his engineers the preliminaries which would lead to an agreement for the operation of the Broad Street subway. This was the substance of a statement issued by Mayor Kendrick of Philadelphia following a conference in the Mayor's office on Jan. 18. Thomas E. Mitten, chairman of the executive committee of the P. R. T.; Ralph T. Senter, vice-president in charge of engineering; City Transit Director Ehlers; Charles B. Hall, president of the Council, and City Solicitor Gaffney attended the conference. This was the first step taken by the city toward the negotiation of a contract with the Philadelphia Rapid Transit. Mr. Mitten said that "many decisions must be made by the city primarily, and the company secondarily, before the actual basis of a P. R. T. operating contract can be intelligently considered."

No Fare Advance in Pasadena

The California Railroad Commission has denied the application of the Pacific Electric Railway for an increase of its street railway and bus fares in the city of Pasadena. The commission finds that the permits for the bus line are held by the Pacific Electric Land Company and are entirely within the city. The commission held that the railway lines are making an adequate return under the conditions in that city.

Celebrates Car and Bus Service

Officials of the Portland Electric Power Company were guests at a jubilee dinner held at Pier 4 in the Peninsula district of Portland, Ore., celebrating the completion and opening on Jan. 1 of the new street car line and supplementary bus service to the St. John's region. This line was long pleaded for by residents of this region. About 400 prominent men in railway circles, city commissions, port representatives and community club boosters attended.

Increases for Detroit Municipal Railway Officials

Increases in salary totaling \$9,800 annually have been granted officials of the Department of Street Railways at Detroit, Mich., by the Street Railway Commission. The advances are retroactive to Dec. 15, 1925. Col. H. U. Wallace, general manager of the municipal railway, heads the list with an increase of \$3,000, from \$15,000 to \$18,000 a year.

William M. Hauser, auditor, who joined the forces of the D. S. R. last April, received an annual increase of \$2,500, making his present salary \$8,500 a year. D. A. Smith, general superintendent, was increased from \$6,000 to \$7,000 a year. F. J. Denny, now assistant general manager, was advanced from \$4,000 to \$5,000 a year and W. R. Dunham, executive engineer, received a \$1,000 increase, raising his salary from \$7,500 to \$8,500 a year. Other increases were: A. C. Colby, superintendent of equipment, \$500, from \$7,500 to \$8,000; P. A. Kerwin from \$7,500 to \$7,800.

Mayor Smith announced that the record that the D. S. R. officials have made fully justifies the increases. He cited that the present management has put the lines on a basis so substantial that the city will not have to borrow a cent or sell a bond to meet all its railway obligations. More buses are to be added. They will be paid for out of earnings, the Mayor stated.

Pennsylvania Company Inserts New Ad

The Beaver Valley Traction Company, New Brighton, Pa., recently inserted the following advertisement in a daily paper. It ran in part:

Sunday morning seems to be the worst morning that our trainmen have for making change. Patrons seem to depend upon the street car conductors to "break" the bills so there will be "change" for the church collections. Why not give us the correct amount and put the bills in the collection?

Purchase Referendum May Be Deferred

Despite 8,300 valid signatures on the petitions requiring a referendum on the proposed purchase by the Seattle, Wash., City Council of the Seattle & Rainier Valley Railway for \$1,200,000, the measure may not go on the ballot on March 9, but may have to be submitted to the people at a special election later. City Comptroller Harry W. Carroll has pointed out that the filing of the petitions closed Jan. 9, and that he cannot certify them to the Council until Jan. 29. Forty-five days must elapse after that before they can be decided at an election. However, proponents of the referendum are going to try to get it on the March 9 ballot.

Atlanta Interurban Increases Rates

Increases in passenger fares and express rates effective Feb. 1 on the Stone Mountain interurban line were granted to the Georgia Railway & Power Company by the Georgia Public Service Commission on Jan. 12. The new passenger rates are exactly as requested

by the company in a petition filed some months ago and on which a public hearing was held Dec. 3. The increase in passenger fares ranges from 25 per cent to 40 per cent above the present rates for single-trip fares and averages 10 per cent on monthly commutation ticket books. Express rates granted are less than those asked by the company, but the minimum express charge of 35 cents is the same as requested by the company.

For a number of years the Stone Mountain interurban line has failed to make a reasonable return to the Georgia Railway & Power Company on the money invested in it. Granting of the new rates also makes it possible for the company to establish its proposed bus line from the terminus of the Stone Mountain line to the location at which the actual carving is being done on Stone Mountain. This will be a real advantage to sightseers wishing to view the memorial but unwilling to pay the high jitney prices now demanded.

Fare Rates in Joplin Explained

Following receipt of an order from the Missouri Public Service Commission officials of the Southwest Missouri Railroad and the Joplin & Pittsburg Railway have increased fares on street car and bus lines in Joplin, Mo. The order provides that the increased rates shall remain in effect for six months. At the end of that time the rates shall be lowered to their former standard unless the commission may grant continuance of the higher fares. The commission further specifies that the rates may be modified or reduced to their former figure by that body before the six months have elapsed. The present fare of 5 cents on the urban lines is increased to 8 cents for one fare or two for 15 cents. The commission's order further authorized interchangeable transfers between street cars and buses of the two lines for a continuous passage in one direction. Free transportation will be given children under five years old. Those between five and twelve years will be charged 5 cents and will be given a 2½-cent coupon good for another passage. The fare advance has been mentioned briefly in these pages.

News Notes

One-Man Car Complaint Withdrawn.—Hearing on the petition of E. C. Smith and others against the use of one-man cars in Atlanta, Ga., by the Georgia Railway & Power Company before the Georgia Public Service Commission was indefinitely postponed on Jan. 11 when the petitioners withdrew their complaint. It was stated, however, that the complaint was withdrawn to permit the petitioners to observe the cars in operation.

Seven-Cent Fare Continued.—The Public Service Commission on Jan. 15 authorized the Binghamton Railway, Binghamton, N. Y., to continue in effect the present 7-cent rate charged in Binghamton, the villages of Port Dickinson, Johnson City and Endicott and in the town of Union, Broome County. It is

provided that the fare for a single ride between Johnson City and Endicott shall be 10 cents, with a fare of 15 cents for a round trip made on the same day.

Franchise in Little Rock Amended.—The City Council of Little Rock, Ark., recently passed an ordinance amending the franchise of the Arkansas Central Power Company which gives the company permission to construct and maintain "loops" at the terminals of several of its lines. The lines to be benefited by the improvement are the Rock Island, East Sixth Street, East Fourteenth, West Ninth, South Highland and Fifteenth Street lines in Little Rock. The "loops" are to be built on private property with shelters to protect waiting passengers. The franchise is to end Sept. 27, 1951, the date upon which the company's present franchise expires.

Transfer Charge Increased.—The Indianapolis Street Railway, Indianapolis, Ind., was authorized by the Public Service Commission to increase its transfer charge from 1 to 2 cents, effective Jan. 1. It is expected the boost will increase street car revenues \$100,000 annually. The previous fare increase granted the company was offset by a decrease in customers.

Ten Cents in Belleville.—The East St. Louis & Suburban Railway, which operates the city railway and bus lines in Belleville, Ill., has announced that it will increase its fare in that city from 7 to 10 cents, effective on Jan. 24. The increase, according to the company's announcement, is made because returns under the 7-cent fare have not taken care of the operating expenses. The new rate is established under authority of a decree of the United States District Court. The 10-cent rate will apply to all trips on city lines and so far west on Main Street at Voellinger Station. The proposed increased fare was attacked recently by members of the Belleville City Council.

New Wage Scale in Effect.—Two hundred employees of the Illinois Traction System operating the line that connects Joliet, Princeton, Ottawa and Streator have accepted a new wage scale providing for an hourly pay ranging from 52 to 63½ cents, effective until Nov. 30, 1926. The former scale ranged from 49 to 60 cents. A wage settlement applying to the main line of the Illinois Traction was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 2, 1926, page 45.

Certificate for Line Between St. Louis and Kansas City Refused.—Refused a certificate of convenience and necessity for the construction of an electric railroad between St. Louis and Kansas City, Mo., the St. Louis & Kansas City Short Line Railroad has appealed to the Cole County Circuit Court from the ruling of the Public Service Commission. The commission denied the certificate largely on the grounds that the company had not made a showing sufficiently conclusive of financial ability to carry out the construction plans.

Files Higher Fare Application.—The New York State Railways has applied to the State Public Service Commission for permission to increase fares on its bus and trolley lines in Utica and Syracuse from 7 to 10 cents. Ten tickets

would be sold for 75 cents under the proposed fare provision. The likelihood of the company's filing such an application was mentioned in the *ELECTRIC RAILWAY JOURNAL*, issue of Jan. 16, 1926, page 126. In its petition the company maintains that the valuation placed by the commission in previous rate cases on the Syracuse and Utica lines is too low. It also states that upon the commission's valuations, plus net additions, the railway lines have failed by a considerable amount to yield a fair return.

Foreign News

Norwegian City to Have Underground Railway.—Oslo, the capital of Norway, is going to construct an underground railway to extend from Majorstuen, a station on the Holmenkollen Railway in the suburbs of Oslo, to the center of the city. The tunnel, which it is expected will be completed within 2½ years, will carry the trains of the four lines handling the heaviest traffic from the surrounding districts to Oslo. Besides resulting in a great saving of time, the proposed tunnel will be of considerable relief in solving the traffic problems of Oslo.

Weekly Tickets on London Railway.—Weekly season tickets have been introduced by the London Electric Railway, London, England, on the Baker Street and Waterloo line. If this scheme proves popular, it will be extended further. Monthly and quarterly season tickets are already in effect.

Railless Development in England.—Trackless trolleys are being adopted in England in place of worn-out tramways on certain routes where traffic is not very heavy. The Nottingham Tramways Committee has decided to substitute the railless system for tramways on a route 2½ miles long. The Town Council is authorized to run trackless cars up to a weight of 10 tons. This will allow the use of double-deck vehicles seating 56 passengers. Ipswich Town Council, which recently decided to convert all the tramways in the borough to the trackless system, has ordered 30 trolley buses at a cost of more than £41,000.

English Railway Extensions.—Liverpool City Council has confirmed a proposal to borrow £87,000 for the construction of additional tramways. Manchester City Council is about to proceed with an extension of tramway routes which will cost approximately £75,000.

Railway in Uruguay Plans to Electrify.—Partial electrification of the Northern Railway from Montevideo to Santiago Vazquez, Uruguay, a distance of 19.5 km., is now under consideration by the management of the state railways and street cars in Uruguay. La Transatlantica, a German street car system of Montevideo, and the railway management are negotiating an arrangement whereby the street car company will operate over the tracks of the Northern Railway instead of building a new and competitive line.

Recent Bus Developments

Co-ordination Plans of the New Haven

Edward G. Buckland, vice-president of the New York, New Haven & Hartford Railroad, which controls the Connecticut Company, operating electric railways and buses in Connecticut, has announced that the corporation will soon issue interchangeable tickets, good for transportation on its steam railroad, its bus lines or, if passengers desire it, on the electric railway system, and that a change in the railroad's schedule is being worked out so that train and bus service might be co-ordinated.

A statement made also announced fourteen bus line routes to be operated as auxiliaries of the steam line in Connecticut, Rhode Island and Massachusetts. Mr. Buckland said that the prices of bus line tickets would be the same as for trains. Mr. Buckland said:

If a traveler should purchase a ticket in New York for New Haven or any other town on the main line he is entitled to be transported to his destination as rapidly as he wishes to go either by rail or by omnibus, and at the same rate of fare. The books of the New Haven system show that, in some cases, our branch line rail service costs us \$1.25 per mile, while our revenue on the same line is only 35 cents a mile.

The institution of buses may not increase our gross revenue because our rates of fare will be the same as before, but it will cut down our expenses and will greatly increase our net income. The adoption of the bus system by the New Haven Railroad will provide better service than has been recently possible by train without increase of cost.

The fourteen lines on which buses will be operated were announced as follows:

Danbury and South Norwalk, Hartford and Suffield, Willimantic and Woonsocket, Willimantic and North Grosvenordale, New Haven to Hartford, Hartford to Broadbrook, Willimantic to Norwich, New London to Norwich, Fall River to Taunton, Fitchburg to Worcester, Providence to Plainville, Providence to Bristol, R. I., Providence to Worcester and Canton Junction to Stoughton, Mass.

On the date that the bus service goes into effect, it was said, extensive revisions of the New Haven's train schedule will be announced.

Bus Lines to Carry Passengers Into Center of Baltimore

Acting in the case of William E. Conway, who operates a passenger bus line from Emmittsburg, Md., to Baltimore, the Maryland Public Service Commission has granted permission for the transportation of passengers to the center of the city. The order was passed upon the application of Mr. Conway. Heretofore the line has been required to discharge passengers at Reisterstown, where they boarded cars of the United Railways & Electric Company for the trip to Baltimore.

It is explained that each case in which the right is sought to run into Baltimore will be decided upon its merits and that the action on the Conway

application does not mean that any line now discharging passengers outside the city where they connect with the street cars will be permitted to continue into the center of the city without the permission of the commission. So far the Conway case is the only one in which action of this kind has been taken. The lines operating to Washington and some other larger places have been permitted to carry their passengers into the center of the city ever since they were started.

The order handed down in the Conway case contains a clause which prohibits the line from transporting passengers between Baltimore and Reisterstown or intermediate points, as this territory is served by the railway. Passengers originating beyond Reisterstown, however, will be conveyed into the center of Baltimore.

Bus Service a Boon to Philadelphia Waterfront

Another important step has been taken by the Philadelphia Rapid Transit Company, Philadelphia, Pa., in its program of co-operation with the various interests of the community which it serves by establishing the Delaware Avenue bus route Q. Transportation has been made available to the workers along the waterfront district of Philadelphia. The route begins at Delaware and Oregon Avenues and operates along Delaware Avenue to Dyott Street, to Norris Street, to Richmond Street, to Delaware Avenue and thus returns to its point of origin.

Route Q will furnish service to maritime establishments as far south as Oregon Avenue, where the Philadelphia tidewater terminal docks are located, and as far north as Cramp's shipyards. The rapid growth of the dock district in Philadelphia, bringing this city to the fore as one of the principal ports of the United States, created a demand for speedier transportation between piers. Within the past two years two groups of piers have been constructed by the city—one the Southwark group, costing \$3,000,000, and the other the Moyamensing group at McKean Street, costing \$9,000,000.

Prior to the operation of this new bus route, there was no direct passenger transportation between piers. It was not desirable, nor was it practicable, to establish trolley service on Delaware Avenue. Traffic congestion made bus operation the only practical solution to the problem. Standard 33-passenger single-deck gas-electric motor buses are being used. The fare is 10 cents with 3-cent exchanges to all connecting car lines. In addition, the exchange privilege is extended to and from the elevated line at South Street station to the Oregon Avenue trackless trolley line.

The new service is appreciated by shipping officials. This is indicated by favorable comment received by the rail-

way from many representative men, among them B. Hoff Knight of the Philadelphia Ocean Traffic Bureau and George F. Sproule, director of wharves and shipping. Mr. Sproule said:

The establishment by the P.R.T. of a bus service along Delaware Avenue will be a great boon to the port of Philadelphia. When the city undertook its program of building up the lowest section of the waterfront by the construction of huge water terminals there was much opposition, as it was generally felt that the inaccessibility of this locality and the difficulties to be encountered in getting labor would render such improvement useless. The bus service on Delaware Avenue has solved this problem.

Competition Brings Lower Fares in St. Louis

Commuters between St. Charles and Wellston, Mo., are enjoying the benefits of reduced fares which are the result of keen competition between the United Railways and the Creve Cœur Drayage & Motor Bus Company operating between the towns into St. Louis.

Last May the bus company started several buses on the St. Charles Rock Road between Wellston and St. Charles, charging 60 cents for the round trip. The United Railways shortly after this cut the street car fare to 50 cents for the round trip to persons who did not buy commutation books. In August the railway installed a fleet of buses to be run on express service between Wellston and St. Charles for a round-trip fare of 70 cents. This service saved time over that of the competing buses. On Dec. 10 the railway put into effect a holiday fare of 42 cents for the round trip. The bus company promptly met this cut rate by reducing its own charges to 40 cents for the round trip and those rates are now in effect. The United Railways has since announced that the holiday rate will be continued indefinitely.

New Service Started.—The Seattle Municipal Railway, Seattle, Wash., started on Christmas Day, 1925, a municipal bus service on Empire Way on a 30-minute schedule.

Buses to Expedite Service.—The Connecticut Company has petitioned the Public Utilities Commission for authority to abandon its Oak Street line in Bridgeport from North Avenue to James Street. A bus line will be operated to supply the needed service and in rush hours a trolley will be used for part of the trip as well as the regular buses.

Would Enlarge Bus Service.—The Lordship Railway, which holds a franchise to operate a trolley line from Hard's Corner, Stratford, Conn., to Lordship Park in Bridgeport, has petitioned the Public Utilities Commission for authority to operate buses over Garfield Avenue to South Main Street at Birdseye Street. This line would provide transportation for the people between the Avon section of Stratford and Bridgeport. If the authority is granted the company will start buses on a schedule allowing a one-hour headway. Some time ago the Lordship company abandoned the trolley line between Hollister Street at Stratford Avenue and Lordship and substituted buses. The new territory over which the company would operate another bus line is

included in the franchise given the company years ago.

Would Operate Bus With Railway.—The Key System Transit Company has applied to the Railroad Commission for permission to operate a bus service in connection with its Leona Heights car line between the end of that car line at the intersection of Calaveras and Woodland Avenues in the city of Oakland, Cal., to Anderson Street. It is proposed to charge a fare of 7 cents per passenger with transfer privileges.

Buses in Walla Walla.—Operation of railway cars in Walla Walla, Wash., by the Walla Walla Valley Railway has been eliminated entirely. On Jan. 1, three buses owned by the Walla Walla Transit Company started on schedules covering the larger portion of the city, heretofore served by the railway. All street car tracks, except the interurban line, which runs to Milton, Ore., will be removed in the immediate future.

Bus Service in New Jersey Increased.—Application was made recently by the Public Service Railway to operate a crosstown bus line on High Street, Newark, N. J. The proposed route would connect radial trolley lines serving the northwestern and southwestern sections of the city. No public transportation facilities have ever existed on High Street, which is four blocks west of the principal railway lines and two blocks west of another railway route. It is proposed to operate four buses.

Wants to Operate Between East St. Louis and Alton.—The Alton, Granite & St. Louis Traction Company on Jan. 4 applied to the Illinois Commerce Commission for a certificate of convenience and necessity to operate a bus line from East St. Louis to Alton, Ill., via National City, Brooklyn, Venice, Madison, Granite City, Nameoki, Mitchell, Hartford, Woodriver and East Alton.

Garage Service in Akron Popular.—Success is attending the operation by the Northern Ohio Traction & Light Company of a garage in connection with its terminal station at Akron, Ohio. Here automobiles are checked for 25 cents by persons who wish to continue their journey by interurban to Cleveland, Canton or other cities in which the company operates. A uniformed attendant checks the car, removes the baggage and brings the car to the patron upon his return to the terminal. During last year the company added 59 buses to its equipment and now operates a total of 164 buses.

Service Extended in Springfield.—A. D. Mackie, general manager of the Illinois Power Company, Springfield, Ill., has announced extension of the Springfield bus lines to include another route. This service will be designated as the North Third Street and Sangamon Avenue line. It will be the fifth bus route since the city granted the traction company the privilege of utilizing buses in city transportation.

Buses Will Supplant Part of Line.—The franchise covering part of its feeder lines expires March 1, but this will not be renewed by the Colorado Springs & Interurban Railway, Colorado Springs, Col. Buses will supplant that part of the street car system which is to be abolished. The rights for the main tramway line through the down-

town part of the city has many years to run. That part of the system will undergo no changes. The part to be abandoned takes in Nob Hill, a residential, educational and hospital section. The situation in Colorado Springs was the subject of a three-page article in the *ELECTRIC RAILWAY JOURNAL* for June 6, 1925, page 885.

Buses in Hourly Service.—Operation of a bus line between Olean, N. Y., and Bradford, Pa., by the Olean, Bradford & Salamanca Bus Lines, Inc., a subsidiary of the Olean, Bradford & Salamanca Railway, opened on Jan. 7. Two 22-passenger Fageol coaches have been purchased. Hourly service between the two cities is maintained from 8 a.m. to 5 p.m. This company operates buses between Kane and Smethport, Pa. It contemplates supplanting its trolley service between Olean and the village of Bolivar with a bus route.

Additional Service in Aurora.—The Chicago & Joliet Transportation Company, subsidiary of the Chicago & Joliet Electric Railway, has been granted permission to operate two new bus lines in Aurora, Ill. The routes will be arranged to provide for peak service.

New Route Started.—The Blue Goose Bus Line, subsidiary of the East St. Louis & Suburban Railway, running between St. Louis, Mo., and Belleville, Ill., began using on Jan. 1 the Eads Bridge instead of the Municipal Bridge to enter St. Louis. The bus fare between the two cities at the same time was increased to 45 cents for the first zone, 40 cents for the second zone and 35 cents for the third, a raise of 10 cents, but transfers to all the Belleville Street cars will be furnished at the new rates.

Would Run Bus Instead of Trolley.—The Ontario Motor Lines, subsidiary of the New York State Railways, has applied to the Council of Canandaigua, N. Y., for the right to operate a bus line in the city in place of the present street car service. The company proposes to serve a wider territory by the buses than is now taken in by the single trolley line.

Bus Growth in 1925.—The St. Louis Bus Company, subsidiary of the United Railways, St. Louis, Mo., during 1925 carried 2,607,115 passengers on buses which traveled 814,807 bus-miles. At the beginning of the year the company was operating only four buses on a single line, the Natural Bridge Avenue route feeding into the Union Boulevard and Natural Bridge divisions of the United Railways. On Dec. 31, 1925, the company had six lines and was using 35 buses of the 29-passenger single-deck pay-as-you-enter street car type. During December, the largest month for the company, its buses carried 316,269 passengers and traveled 96,633 bus-miles.

New Routes Authorized.—The Boston Elevated Railway, Boston, Mass., has been authorized by the Public Utilities Commission to operate three auto bus routes as follows: A route from Copley Square to South Station, which was planned to avoid congestion, a second route from Andrew Square to Old Colony Avenue and a third from the Boylston and Ipswich Street loop extension to connect with the present Fenway-Bowdoin Square bus line.

Financial and Corporate

\$5,000,000 Increase in Capital in Philadelphia Approved

The City Council of Philadelphia, Pa., on Jan. 14 approved by a vote of 16 to 4 an increase of \$5,000,000 in the capital stock of the Philadelphia Rapid Transit Company. Of this amount \$3,000,000 will be expended in the purchase of the Yellow Cab Company, and the remaining \$2,000,000 will be spent for garages and other additions to the service.

A supplementary ordinance also was passed on Jan. 14 providing for the merging of taxicab income with the earnings from other units of the P. R. T. system in order that the city may share in the surplus, as provided in the city-company agreement of 1907, and to allow a common basis for rate fixing.

The option of the P. R. T. on the taxicabs has been extended and it is not known just when the purchase will be consummated.

Earnings at Rochester Slightly Behind

The report of Charles R. Barnes, commissioner of railways at Rochester, N. Y., for the quarter ended Oct. 31 shows that the New York State Railways, Rochester lines, failed by \$41,544 to meet the return guaranteed under the service-at-cost contract. The deficit from railway operations was \$34,265 and from buses \$7,279. The total revenue from all railway operations for the three months was \$1,189,883, with

total operating expenses of \$841,290. Trolleys carried a total of 22,962,024, including transfers, during the period; trackless trolleys transported 376,631 and buses 57,922, a grand total of 23,387,577 passengers. The results are tabulated in the accompanying summary.

Small Loss in Oklahoma City—Buses Do Well

Financial statement of the Oklahoma Railway, Oklahoma City, Okla., now in the hands of the receivers, is expected to show a deficit of \$20,000 for the year 1925. The year started off well, but there was a marked decrease in receipts during the summer months. September showed an increase, which continued through the months of October and November. Stockholders of the company have hopes for a brighter year in 1926. Bus operation, utilized to supplement railway service in Oklahoma City, has proved profitable. The company now has three bus lines in Oklahoma City, all of them doing a good business. Three new Reo buses were delivered to the company last week and immediately put in service on arrival, though without the customary several coats of paint. There was an immediate demand for these buses and the company could not wait for them to be painted at the factory. They will be painted in the shops of the company here. There will be further expansion in the bus lines of the company in the near future, but no definite plans have yet been announced by the receivers. The annual meeting is set for Jan. 26.

Decision Setting Aside Rates Regarded Important

In a federal court decision handed down at Madison, Wis., by Judge Claude S. Luce the Oconto City Water Company won its fight to set aside rates fixed by the Railroad Commission, which were considered so low as to be confiscatory. The decision is the outgrowth of an appeal. It grants the water company a rate higher than the one fixed by the commission. A point in the decision regarded of far-reaching significance is the fact that the views expressed would seem to cast doubt on the validity of the theory on which the Wisconsin commission has valued public utility property in the state. The federal ruling has been interpreted to indicate the need for rates based on present reproduction costs rather than average prices taken over a period of years, which basis the commission follows.

Aurora, Elgin & Fox River Included in Western United

A syndicate headed by E. H. Rollins & Sons, with Blair & Company, Inc., Harris, Forbes & Company, Halsey, Stuart & Company, Inc., Marshall Field, Glore, Ward & Company, Spencer Trask & Company, the Illinois Merchants Trust Company and the First Trust & Savings Bank, Chicago, offers a new issue of \$22,500,000 Western United Gas & Electric Company first mortgage 5½ per cent bonds, due Dec. 1, 1955, at 99 and interest, to yield about 5.55 per cent. The bonds are issued as a result of the consolidation of numerous properties, the securities of which are to be retired, and the new issue will be a first mortgage on all the properties.

The bonds will be secured by direct

OPERATING RESULTS IN ROCHESTER FROM AUG. 1, 1925, TO OCT. 31, 1925, INCLUSIVE

	Cents per Car- Mile	Dollars per Car- Hour
Railways: Miles of road operated.....	78.81	
Car-miles.....	2,402,298	
Car-hours.....	275,332	
Revenues from railway transportation:		
Passenger revenues.....	\$1,164,325	
Chartered car revenues.....	707	
Mail revenues.....	17	
Miscellaneous transportation revenues.....	467	
Total revenue from railway transportation.....	\$1,165,518	48.51
Revenues from railway transportation:		
Station and car privileges.....	\$13,160	
Rent from tracks and facilities.....	7,471	
Rent from buildings and other property.....	3,734	
Total revenue from other railway operations.....	\$24,365	1.02
Total revenue from all railway operations.....	\$1,189,883	49.53
Railway operating expenses:		
Maintenance of way and structures.....	\$120,089	5.00
Maintenance of equipment.....	85,742	3.57
Power.....	62,835	2.62
Conducting transportation.....	412,776	17.18
Traffic expenses.....	3,096	.13
General and miscellaneous expenses.....	111,749	4.65
Renewals and depreciation.....	45,000	1.87
Total railway operating expenses.....	\$841,290	35.02
Net revenue from railway operations.....	\$348,593	14.51
Auxiliary operations:		
Revenues.....	\$907	.04
Expenses.....	1,188	.05
Auxiliary operating deficit.....	\$280	.01
Net railway and auxiliary operating revenue.....	\$348,312	14.50
Taxes assignable to railway operations.....	90,754	3.78
Railway operating income.....	9	.00
Non-operating income.....	9	.00

	Cents per Car- Mile	Dollars per Car- Hour
Railway gross income.....	\$257,567	10.72
Bus lines operating deficit.....	5,012	
Service-at-cost gross income.....	\$252,555	
Return on investment, railway property.....	\$291,832	12.15
Return on investment, bus lines.....	2,267	
Total return on investment.....	\$294,100	
Service-at-cost operating deficit.....	\$41,544	

SUMMARY OF OPERATION OF CO-ORDINATED BUS LINES, UNDER SERVICE-AT-COST CONTRACT AUG. 1, 1925, TO OCT. 31, 1925, INCLUSIVE

	Gasoline Buses	Trackless Trolley Buses
Bus-miles.....	20,636	55,645
Bus-hours.....	2,325	7,647
	Gasoline Buses	Tr'k'l's
	Cents per Mile	Dollars per Hour
Operating revenues:		
Passenger revenues.....	\$3,011	\$12,731
Operating expenses:		
Maintenance of way and structures.....	1	.01
Maintenance of buses.....	2,606	12.63
Gasoline and power.....	714	3.46
Conducting transportation.....	2,572	12.47
General and miscellaneous.....	737	3.57
Total operating expenses.....	6,332	32.14
Net operating deficit.....	3,621	17.55
Taxes.....	94	.45
Total operating deficit.....	3,715	18.00
Return on investment.....	380	1.85
Deficit applicable to service-at-cost.....	4,095	19.85
Operating deficit; both lines.....	5,012	
Return on investment.....	2,267	
Bus lines deficit applicable to service-at-cost.....	7,279	

first mortgage on all properties owned by the company in fee, and by pledge and deposit of all of the capital stock and funded debt of the Coal Products Manufacturing Company and of the Aurora, Elgin & Fox River Electric Company, which owns the electric railway properties. The company serves a rapidly developing territory west of and contiguous to Chicago and the reproduction cost of the mortgaged property is estimated at \$40,000,000.

Fitkin Interests Get Shannahan-Peck Property

Acquisition by Fitkin Utilities, Inc., of the Newport News & Hampton Railway, Gas & Electric Company of Virginia, of which J. N. Shannahan is president, was announced on Jan. 20. The Fitkin interests have acquired 80 per cent of the preferred and common stocks of the Newport News property at a price understood to have been \$110 a share. The property will be combined with the Virginia-Western Power Company, Virginia-Northern Power Company and other Virginia holdings in a subsidiary of the National Public Service Corporation, the Fitkin utility holding company.

Efforts made to locate Mr. Shannahan so as to get a statement from him were unavailing, but at the office of Fitkin & Company it was said that as the deal had only just been concluded the question of any possible change in personnel had not even been considered, but that Mr. Shannahan would undoubtedly continue as a director, if not an officer, under Fitkin control.

Successor Company in Danbury Seeks Approval of Plans

The Danbury & Bethel Traction Company, Danbury, Conn., will succeed the Danbury & Bethel Street Railway under reorganization. A request has been filed with the Public Utilities Commission for approval of the reorganization plans. The Danbury & Bethel Traction Company plans to reconstruct the lines with the proceeds of a new bond issue. At the hearing on Jan. 5 the commission was asked to approve \$500,000 of first mortgage gold bonds and \$300,000 of 6 per cent preferred stock and an issue of 3,000 shares of common of no par value.

More P.R.T. Stock for Car Riders

If any one in Philadelphia was unaware on the evening of Thursday, Jan. 21, that the Philadelphia Rapid Transit Company had that day undertaken another large drive for the sale of preferred stock to car riders, it certainly came about through no lack of publicity effort on the part of the company. Every car and bus in service was placarded inside and out with investment slogans, the newspapers were accorded full-page advertisements on the subject and thousands of "Read-as-You-Ride" Service Talks were distributed by mail and by employees' committees telling of this additional issue of stock.

Reports from the various sales headquarters indicate that the present issue will be floated in even more rapid fashion than that made in February, when \$3,000,000 was oversubscribed in six days.

Stockholders of the company voted unanimously on Jan. 20 to approve the issue of an additional \$15,000,000 of preferred stock, carrying dividends of 7 per cent. It is understood, however, that only a portion of this will be sold at the present time. An additional block may later be offered to finance the purchase of the taxis by the P.R.T., according to a report appearing in the Philadelphia Record. No more than twenty shares of stock may be subscribed by any individual and any subscription may either be paid for outright or on a plan of deferred payments, \$1 per share per week being payable to any conductor or subway-elevated cashier.

As stated in Service Talks, the funds resulting from the present issue will be used in carrying out several comprehensive extension programs. They are:

Making ordinary extensions and improvements to the transit system.
Building track extensions to serve the Sesqui-Centennial Exposition and encourage the building of homes in South Philadelphia.
Building and improving motor bus garages, carhouses and power stations.
Purchasing and rehabilitating the Frankford, Tacony & Holmesburg Railway.
Retiring certain senior securities.
Replacing in P. R. T. treasury moneys temporarily taken from P. R. T. reserves for improvements and extensions.

The present issue is also open to subscription by employees of the company on the same deferred payment plan, with the exception that the pay-

ments will be deducted by the company from the weekly pay envelopes. No interest is to be charged to subscribers making use of the deferred plan, so that the shares cost them no more than would be the case under a plan of outright purchase.

Dayton-Union City Line Out of Existence

After service of 25 years, the Dayton-Union City branch of the Indiana, Columbus & Eastern Traction Company lines passed out of existence on Dec. 31, authority having been granted by the Ohio Utilities Commission to abolish the division. Company officials said it had not been paying for several months. As was mentioned in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 19, 1925, page 1091, bus substitution is planned.

The line was organized in 1901 by Dr. J. E. Lowes, Joseph Feight and H. J. Kiefaber, all of Dayton, to operate between Dayton and Greenville. It was the first interurban in Ohio to operate over its own right-of-way, and also the first to introduce regular freight service. In 1904 the line was extended to Union City and a year later through to Muncie, Ind. A few years ago it became a part of the former Ohio Electric Railway. The line was 55 miles long. Much of the real estate of the right-of-way reverts to the original owners.

Surplus in December in Toledo

A surplus of \$2,290 was earned in December, 1925, by the Community Traction Company, Toledo, after providing for all expenses, funds and dividends. This is the first surplus since March, 1925. Gross revenue was \$328,993, compared with \$340,761 for the similar month last year. The lines carried 4,417,488 revenue passengers, compared with 4,491,372 for December, 1924. There was an increase in car mileage operated. Operating expenses were \$227,697, a ratio of 69.21 per cent of total revenue.

The total deficit for 1925 was \$108,211. This is offset by a corresponding decrease in rent of tracks and terminals. Maintenance funds were decreased from \$770,000 in 1924 to \$680,000 in 1925. Expenditures, however, increased. Oper-

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Street Railway Fares* 1913 = 4.84	Jan. 1926 7.32	Dec. 1925 7.30	Jan. 1925 7.25	Jan. 1926 7.32	May 1923 6.88
Electric Railway Materials* 1913 = 100	Jan. 1926 154.3	Dec. 1925 153.9	Jan. 1925 150.3	Sept. 1920 247.5	Oct. 1924 148.5
Electric Railway Wages* 1913 = 100	Jan. 1926 223.8	Dec. 1925 223.0	Jan. 1925 221.0	Sept. 1920 232.0	May 1923 205.8
Am. Elec. Ry. Assn. Construction Cost (Elec. Ry.) 1913 = 100	Jan. 1926 202.2	Dec. 1925 202.2	Jan. 1925 205.3	July 1920 256.4	May 1922 167.4
Eng. News-Record Construction Cost (General) 1913 = 100	Jan. 1926 207.2	Dec. 1925 206.0	Jan. 1925 210.4	June 1920 273.8	Mar. 1922 162.0
U. S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Dec. 1925 156.2	Nov. 1925 157.7	Dec. 1924 157.0	May 1920 246.7	Jan. 1922 138.3

Conspectus of Indexes for January 1926

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Bradstreet Wholesale Commodities 1913 = 9.21	Jan. 1 1926 14.01	Dec. 1 1925 14.41	Jan. 1 1925 13.93	Feb. 1 1920 20.87	June 1 1921 10.62
U. S. Bur. Lab. Stat. Retail Food 1913 = 100	Dec. 1925 165.5	Nov. 1925 167.1	Dec. 1924 151.5	July 1920 219.2	Mar. 1922 138.7
Nat. Ind. Conf. Bd. Cost of Living 1914 = 100	Dec. 1925 171.4	Nov. 1925 171.1	Dec. 1924 166.1	July 1920 204.5	Aug. 1922 154.5
Steel Unfilled Orders (Million Tons) 1913 = 5.91	Dec. 31 1925 5.033	Nov. 30 1925 4.582	Dec. 31 1924 4.817	July 31 1920 11.118	July 31 1924 3.187
Bank Clearings Outside N. Y. City (Billions)	Dec. 1925 20.01	Nov. 1925 18.35	Dec. 1924 18.45	Oct. 1925 20.30	Feb. 1922 10.65
Business Failures Number	Dec. 1925 1627	Nov. 1925 1462	Dec. 1924 1911	Jan. 1924 2231	Aug. 1925 1353
Liabilities (Millions)	43.08	42.78	57.77	122.95	27.22

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway opera-

tion and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 144 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads. †Not including fuel (171.8 with fuel).

ation for 1925 covered 6,727,174 car-miles, compared with 7,108,643 car-miles in 1924.

Power Company Takes Over Railroad's Electric Customers

The Cleveland Electric Illuminating Company, Cleveland, Ohio, a subsidiary of the North American Company, has purchased the Cleveland, Painesville & Eastern Railroad. Included in the purchase are the electric light and power properties, but not the railroad properties of the United Light & Power Company, a subsidiary of the purchased company. Announcement of the price was withheld pending approval by the Ohio Public Utilities Commission. The acquired properties serve about 7,000 consumers, whose requirements are about 14,000,000 kw.-hr. annually.

Suburban Line Would Dismantle Road.—The Chicago & Interurban Traction Company, Chicago, Ill., has filed a petition with the Illinois Commerce Commission for permission to dismantle this 50-mile electric railway between Chicago and Kankakee.

Warrant Basis in Seattle.—In order to raise money to meet a payment on March 1, 1926, on the \$15,000,000 bond issue for the purchase of the Seattle Municipal Railway system, Seattle, Wash., from the Puget Sound Power & Light Company, the railway department has gone on a warrant basis. The department must have the March payment, \$833,000, which will be the fifth of the issue, ready by Feb. 1, 1926, and it must be in the hands of the city's fiscal agency in New York by Feb. 16. A total of \$3,322,000 has been paid on the \$15,000,000 debt so far.

Court Names New Receiver.—The resignations of W. H. Sawyer and Fred E. Allen as receivers for the Alton, Granite & St. Louis Traction Company have been accepted by Federal Judge English in East St. Louis, Ill. Both had served as receivers for the company since Dec. 20, 1921. Pressure of other business was responsible for their resignations. Mr. Sawyer, it will be recalled, is planning to go to Australia on a mission for the Australian government. Following the acceptance by Judge English, he appointed T. W. Gregory, secretary-treasurer of the East St. Louis & Suburban Railway, receiver for the Alton, Granite & St. Louis Traction Company.

Injunction Against Sale of Suburban Road.—The sale of the old Frankford, Tacony & Holmesburg Street Railway to the Philadelphia Rapid Transit Company, Philadelphia, Pa., has been enjoined by Common Pleas Court No. 2. President Judge Horace Stern handed down an opinion in the injunction suit brought by minority bondholders of the Frankford, Tacony & Holmesburg against the bondholders' protective committee, which bought in the property and franchise of the old road at the receiver's sale, and then formed the Northeastern Philadelphia Transit Company. The decision of the court is intended to restrain it from reselling the franchise and property to Edward J. Ryan, as agent of the Philadelphia

Rapid Transit Company. The franchises and property of the old Holmesburg road were bought in by the bondholders' protective committee for \$350,000, and it proposed to sell the same to the P. R. T. interests for \$300,000. The complainants alleged this sum was inadequate. Furthermore, they disputed the authority of the committee to consummate the sale of the property under the terms proposed.

December Surplus in Philadelphia \$133,658.—The operating revenue of the Philadelphia Rapid Transit System, Philadelphia, Pa., for the month of December was \$4,608,309, with "operation and taxes" \$3,500,409. The surplus for the month amounted to \$133,658. There was a total passenger revenue of \$4,545,577, of which \$4,402,197 was from surface, subway and elevated and \$143,380 derived from bus passengers. The number of passengers carried totaled 83,416,897. Of this number 81,862,870 traveled on the surface lines, subway and "L" and 1,554,027 passengers were carried by the bus lines.

Applies to Issue Bonds.—The Key System Transit Company, Oakland, Cal., has applied to the Railroad Commission for authority to issue and sell \$2,500,000 of first mortgage 5½ per cent gold bonds, series C, and to use the proceeds derived from the sale to finance capital expenditures.

Temporary Discontinuance Allowed.—Permission was granted by the Public Service Commission on Jan. 15 to the New York State Railways, Utica lines, to discontinue trolley service on the James-Oneida and the Auburn Avenue shuttle lines until July 1, 1926, at which time the company will be required to restore the service or else proceed under the law to abandon the lines. The company started buses last October as an experiment along Oneida Street serving a considerable portion of the territory formerly supplied by the two shuttle lines. The bus service is so well patronized that the company will increase it as soon as additional buses, which have already been ordered, can be delivered.

Book Review

Super-Power—Its Genesis and Future

By W. S. Murray. Published by McGraw-Hill Book Company, New York, N. Y. 1925. 237 pages. Price \$3.

Perhaps the contribution in this book of greatest interest to ELECTRIC RAILWAY JOURNAL readers is the suggestion by W. S. Murray that the mercury-arc rectifier may be the golden key that will unlock the dissensions of the past and make possible the long-looked-for expansion of heavy traction electrification.

Mr. Murray regards the tremendous growth of the 60-cycle power systems in the country as an important factor in the decision of the type of system to be used today. The author is careful to suggest the "consideration" of the rectifier in future systems, but does not recommend its "use" because at the present moment the rectifier is new in this country and has not yet been subjected to the test of time.

Not 5 per cent difference in annual costs exists among the modern types of systems recently installed. This statement is sustained by the author by the analysis outlined in the long chapter on railroad electrification.

The question "Why has there not been more electrification?" is answered thus by the author:

1. The credit of the steam railroads has been limited for many years.

2. There has been a certain amount of prejudice against electrification on the part of railroad managements long trained in the art of steam operation.

3. The large electrical manufacturers of the country have themselves been unable to agree on any one system.

The author says he shares in the blame for the never-ended battle of the systems.

The book starts off with a chapter on power, in which the author shows the relative effect of power in the development of the extensive industrial life of

the United States. It is stated that 3 hp. is the average amount of mechanical power back of every industrial worker in the United States. This is twice as much power as is available for industrial workers in any other country.

Following the discussion of power, Mr. Murray devotes a chapter to the birth of electric utilities and two chapters to the ownership of utilities. These are replete with excerpts from reports from foreign countries and other data that contribute a distinct note to the material available on the relative merits of government versus private ownership.

Formation of the super-power survey, started in 1918, is well set forth. With the aid of E. G. Buckland, vice-president of the New York, New Haven & Hartford Railroad; Franklin K. Lane, Secretary of the Interior, and Dr. George Otis Smith, director of the U. S. Geological Survey, Congress on July 1, 1920, finally authorized the survey to be made. The report was finished within the allotted time of one year, and without over-running the appropriation of \$125,000 made to complete the study.

Under the entrancing title Super-Power, Mr. Murray has succeeded in creating a word picture of electric power with its great possibilities that should interest the thousands of people who in their daily life have contact with the generation or use of electricity. In fact, the author has dealt with a truly large subject in a masterly way. Ideas expressed by him in the survey may not meet with the entire approval of the industry, but his portrayal of the future is an inspiration. The volume is concluded with the remark used many times before by the author, apropos of the World War: "We have spent millions for destruction, for preservation; now let us spend millions for construction, for conservation."

Personal Items

A. W. McLimont President

Former Vice-President and General Manager Heads the Winnipeg Electric Company

A. W. McLimont was elected president of the Winnipeg Electric Company, Winnipeg, Man., and its subsidiaries on Jan. 4. He succeeds G. W. Allan as president. W. R. Bawlf, president of the N. Bawlf Grain Company, Winnipeg, was elected vice-president to succeed Mr. McLimont in that office.

By virtue of his extended experience in the public utility field, both in North and South America, and his active connection with the affairs of the Winnipeg Electric during the past eight years, Mr. McLimont is well qualified for his new position. He belongs to



A. W. McLimont

that school of public utility operators which recognizes an equal partnership and responsibility among the public, the public utility company and the utility's employees. The interests of all, he holds, are interdependent and must be mutually recognized if any measure of success is to be obtained.

One of his outstanding personal characteristics as a public utility operator is his deep and unshaken faith in the "fairness of the public." He has always believed that any public utility should lay all its cards on the table, take the public into its confidence and give it the facts concerning that utility's problems as they arise. Mr. McLimont has developed this policy, and as a result the public of Winnipeg is better informed about its street railway and the problems confronting it than is the public in most other cities.

The inherent spirit of "square dealing and fair play" in the man has marked his relations with his employees, with whom he has dealt on a broad basis and with sympathetic understanding.

While adhering to his determination to give the public a full measure of service for the price it pays, he has exercised close personal control of the company's operations and has made the Winnipeg street railway one of the

most efficiently operated systems in Canada and the United States.

By his new appointment, patrons of the various services rendered by the Winnipeg Electric Company, which operates the local electric railway, are assured of a continuance of that policy which has been in evidence for some time now—a policy designed to give "the best possible service at the lowest possible cost," in the attainment of which the interests of the public, employees, and company are developed in an atmosphere of mutual good will.

Born in Quebec City, Mr. McLimont got his first glimpse of Winnipeg in 1885, when he came West as a member of the expeditionary forces raised at the time of the rebellion. From that time on his life has been spent in public utility work in all its phases. Among the important executive positions he has held might be mentioned—general manager of the Dubuque Light & Traction Company, Dubuque, Iowa; transportation engineer of the Public Service Commission for the First District of New York, vice-president of the Chicago & Milwaukee Electric Railway, vice-president and general manager of the Michigan United Railways, vice-president and general manager of San Francisco-Oakland Terminal Railways, now the Key System Transit Company; and vice-president and general manager of the Georgia Power Company.

W. H. Carter, president of the Carter-Halls-Aldinger Company, Ltd., Winnipeg; N. J. Breen, Western general manager of the Lake of the Woods Milling Company, Winnipeg, and James B. Woodyatt, president of the Southern Canada Power Company, Montreal, have been elected directors of the Winnipeg Electric Company.

C. J. Bell Chairman and F. W. Doolittle Director

Charles J. Bell, president of the American Security & Trust Company, Washington, D. C., and for years a member of the board of directors of the Washington Railway & Electric Company, has been elected chairman of the latter body to succeed the late Milton E. Ailes.

Emory L. Coblenz declined re-election to the board and F. W. Doolittle, vice-president of the North American Company, was named in his stead.

Messrs. Pearson and Buckland on Connecticut Company Personnel

At a meeting of the directors of the Connecticut Company, New Haven, Conn., on Jan. 12, E. J. Pearson of the New York, New Haven & Hartford Railroad was made chairman of the board of directors and E. G. Buckland was made vice-chairman of the board. All other officers of the Connecticut Company remain the same—J. K. Punderford as president, W. J. Flickinger as vice-president, etc. There are no changes in personnel whatever, except in

the board of directors. In addition to the election of Mr. Pearson and Mr. Buckland to the respective offices previously mentioned, each of the Connecticut members of the New Haven's board of directors was invited to become a member of the board, as were also the trustees in whose hands the Connecticut Company was placed under the federal dissolution decree of 1914, just recently modified to provide for the restoration of the Connecticut Company to the control of the New Haven Railroad.

E. S. Pardoe Bus Superintendent in Washington

E. S. Pardoe has been made superintendent of bus operation of the Capital Traction Company, Washington, D. C. He has been with that company since 1919 in the engineering department, and since 1921 has been an assistant engineer. Mr. Pardoe attended the public schools of Washington and was graduated from the Technical High



E. S. Pardoe

School. He attended the University of Pennsylvania and later George Washington University, from which he was graduated with the degree of bachelor of civil engineering in 1924.

The bus operations of the Capital Traction Company have expanded quite rapidly in the last few years. That company operates seven lines, which, with two exceptions, are feeders or extensions of existing street car lines.

S. R. Inch President of Florida Power & Light

S. R. Inch has been elected president of the Florida Power & Light Company, organized on Dec. 28, 1925, in Florida as a vehicle for the operation of the properties in that state under the supervision of the Electric Bond & Share Company. The company is controlled through ownership of all of its second preferred and common stocks by the American Power & Light Company. The Florida Power & Light Company controls the properties operating the electric railway systems in Miami and Miami Beach, Fla. Mr. Inch is well known in the railway field. He became associated with the Utah Power & Light Company as general superintendent in 1913. Before that he had

been located in Montana managing public utility properties owned by W. A. Clark. He was made operating manager at Salt Lake City in May, 1915, and less than three years later he succeeded C. E. Groesbeck as vice-president and general manager of the Utah Power & Light Company and vice-president of the Utah Light & Traction Company.

More Brooklyn City Appointments Announced

Last December C. E. Morgan, vice-president and general manager of the Brooklyn City Railroad, Brooklyn, N. Y., announced the appointment of Lester E. Curry, Hugh Savage and Hugh K. Sherman as superintendent of overhead lines, superintendent of equipment and purchasing agent respectively of that company. Mr. Morgan has now announced the following appointments:

L. J. Davis, assistant to general manager in charge of the mechanical and electrical departments.

H. F. Merker, chief engineer of way and structures. J. A. Rosenberger, acting superintendent of roadways.

V. A. F. Neilsen, superintendent of buildings.

C. A. Hammel, general storekeeper.

All five of these officials have been connected with the Brooklyn City Railroad or Brooklyn-Manhattan Transit organizations for several years. Mr. Davis and Mr. Merker will make their headquarters at the general office building, but Mr. Rosenberger and Mr. Neilsen will make their headquarters at the administration building, on Nostrand Avenue.

The way and structures department work for the B.-M. T. surface lines has been placed under the direction of Henry J. Kolb, who has been made chief engineer of way and structures for all B.-M. T. lines—surface as well as rapid transit.

C. W. Burke has been appointed assistant chief engineer of way and structures for the B.-M. T. lines.

Frederick L. Finch will continue as superintendent of surface roadway of the B.-M. T. surface lines, reporting to Mr. Kolb. Mr. Finch's headquarters will be at the new B.-M. T. surface track division office at Smith and Ninth Streets.

W. H. Wharton will continue as superintendent of buildings.

The trucking division of the B.-M. T. way and structures department, heretofore located at Nostrand Avenue, will be transferred to the 24th Street garage and the operation of motor cars will be under the direction of the surface transportation department. The maintenance of these motor cars will be cared for by the mechanical department as part of the work under the supervision of the general foreman of the Ninth Avenue inspection shop.

I. M. Burns Made Shop Superintendent in Brooklyn

I. M. Burns has been appointed to succeed the late George J. McDonough as superintendent of rapid transit inspection shops of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y. Mr. Burns was advanced from

the position of general foreman at East New York inspection shop. He will make his headquarters at the 36th Street inspection shop.

At the East New York inspection shop, C. I. Ekerman succeeds Mr. Burns as general foreman and J. C. Heiberg has been appointed assistant general foreman.

F. N. Parsons has been appointed superintendent of the new electrical repair shop at Gravesend Avenue and Avenue X, which was placed in service on Jan. 4, 1926. E. C. Parham is foreman at the new shop. The shop force and equipment were transferred from their old quarters at the 52d Street repair shop at the first of the year and the 52d Street repair shop was taken over by the Brooklyn City Railroad.

F. C. Horner in New General Motors Post

F. C. Horner of the staff of Alfred P. Sloan, Jr., president of General Motors, has been appointed assistant to Vice-President Alfred H. Swayne, chairman of the corporation's traffic association. Mr. Horner will be in charge of the development of the commercial motor vehicle field on electric and steam roads.

Under the direction of Mr. Horner, a railroad service department was started more than two years ago by General Motors to deal with this problem in a definite manner. This department is purely a transportation engineering research organization.

It is pointed out that General Motors having acquired the Yellow Truck & Coach Manufacturing Company is in position to take every advantage of the opportunity offered and at the same time promote the scientific co-ordination of rail and road transport facilities; thus aiding in the elimination of wasteful transportation methods both within and outside large terminal areas.

F. C. Shoemaker is now master mechanic and garage superintendent of the Illinois Power & Light Corporation at the Decatur property. He succeeds Charles H. Woods, who resigned late in 1925 to become a district sales representative of the International Motor Company. Mr. Shoemaker had been in the service of the Illinois Traction system at the general shops at Decatur for 3½ years when in July, 1922, he resigned to assume the position of staff engineer of the Texas Company, railway division. Before going to the Illinois Traction System he was connected with the old Fort Wayne & Wabash Valley Traction Company and the Fort Wayne & Northern Indiana Traction Company, at Fort Wayne, Ind.

William Goldner, in the employ of the Grand Rapids Railway, Grand Rapids, Mich., for 37 years, is on a leave of absence because of ill health. He has been succeeded by Ernest M. Lunda, appointed superintendent of equipment, as referred to in the *ELECTRIC RAILWAY JOURNAL*, issue of Nov. 21, 1925, page 933.

William H. Dougherty, prominent in the transportation department of the Williamsport Passenger Railways, Williamsport, Pa., has tendered his resignation. Mr. Dougherty started with

the corporation in 1889 when horse-drawn cars were still in operation. He served as driver and later as conductor and motorman. He was made a dispatcher in 1900.

Walter J. Hodgkins, vice-president and general manager of the Lake Superior District Power Company, Ashland, Wis., in whose service he started at the very bottom sixteen years ago, was named vice-president and general manager of both the Michigan Gas & Electric Company and the Houghton County Gas Company at a meeting held in Chicago on Dec. 31. Mr. Hodgkins will continue to direct the activities of the Lake Superior Company at Ashland, where the general offices of the three companies will be centered. The Lake Superior District Power Company operates 17 miles of electric railway.

Obituary

F. P. Edinger

Frank P. Edinger, formerly superintendent of transportation of the Chicago Surface Lines, died on Dec. 20. He had been connected with the Chicago Railways or its subsidiaries since 1893. He began his career as a conductor and worked up through the transportation department. Later he became superintendent of one of the north side districts. In 1914 at the time of the unification of the surface lines he was transferred to the west side and placed in charge of the sixth division. Prior to his appointment as superintendent of transportation he served as acting superintendent. He next was made superintendent.

C. A. Gould

Charles Albert Gould, founder of the Gould Coupler Company and the Gould Storage Battery Company, died on Jan. 6 in New York City. Mr. Gould was a pioneer in the development of automatic car couplers, electric train lighting, vestibule passenger cars and other railroad devices. In 1869 he was an accountant in Buffalo and later served as postmaster of Buffalo and collector of customs. About ten years later he organized and became president of Gould & Stimson, which later grew into the Gould Coupler Company. He remained at the head of this organization until Jan. 1, 1925, when he disposed of his interest in the business to serve as president of the Gould Realty Company and the Gould Securities Company. He was born in Batavia, N. Y., in 1849. His hobby was horses and dogs. In his will he left \$20,000 to "provide for the board and keep of all dogs and horses owned by me."

Caleb S. Jackson, formerly treasurer of the Eastern Massachusetts Street Railway, Boston, Mass., dropped dead on Jan. 2 in the subway station at Kendall Square. He was to have stood trial on three charges late in January over a shortage in his accounts of \$48,000 discovered about a year ago. At that time he resigned as treasurer.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

High Hopes for Copper in 1926

Although the manufacture of copper products at the outset of 1926 is slightly less than was the case a year ago, no concern is felt for the year's prospects by large manufacturers in the field. In fact, quite to the contrary, anticipations of a most successful period seem to be the order of the day. Orders from the electrical industry are being received in gratifying volume, although no large activity in steam railroad electrification or in track extensions among the electric railways is apparent just now. The development program within these last two fields will doubtless be considerably accelerated within the next few weeks.

The outstanding feature in the copper trade during 1925 was the enormous domestic demand, far exceeding the expectations of even the most sanguinary observers. Large deliveries in the month of December to American mills brought the stock of marketable copper to the lowest point in the history of the commodity, notwithstanding lower exports. With consumption of copper outrunning production it is scarcely to be wondered that a spirit of optimism prevails in the industry.

So far as European consumption is concerned the falling off in purchase has not been occasioned by any reduction in the need for the metal. It has simply been impossible for foreign consumers to lay their hands on the necessary funds with which to finance their buying. The general belief is that conditions in Europe are slowly but surely improving, and if this is actually the case the copper industry will probably benefit as much as any other American enterprise. Development of the tremendous domestic consumption of copper and copper products has taken place over the past four years and no evidence is at hand to show that the end is in sight.

1925 Car Equipment in New York City Totaled \$9,000,000

Material additions to rolling stock in operation were made in 1925 by the railways under the jurisdiction of the New York Transit Commission, having authority in New York City. One hundred and fifty-four new steel rapid transit cars and 335 new trolley cars, bought by direction of the commission and with its approval, went into service, representing a total expenditure for these two items of about \$9,000,000. Trunk line cars to the number of 130 were also placed in operation. With the additions named to the rapid transit and surface line cars, there are now approximately 13,125 cars used in operation upon local transportation lines in the city of New York. It is

estimated now that the subway, elevated and surface cars required to carry New Yorkers each business day represent an approximate investment of \$111,000,000. Toward the close of the year the Brooklyn-Manhattan Transit Corporation directed that bids be asked for supplying 201 articulated cars to form 67 triplex units for rapid transit use.

Big Order for Timken

Axle Equipment for the 333 Public Service Buses in New Jersey Has Unique Features

Several departures from conventional practice characterize the axle equipment being supplied by the Timken Detroit Axle Company for the 333 gas-electric buses recently ordered by the Public Service Corporation of Newark, N. J., from the Yellow Truck & Coach Manufacturing Company. The axles are similar to those used under the 210 gas-electric buses delivered in 1925 to the Philadelphia Rapid Transit Company.

The rear axle will have the dual worm drive, known as type 6530, for the dual motor drive type of gas-electric bus. It was designed and built especially for

Coach Company. It is suitable for heavy-duty bus service and is of the inverted Elliot type with inclined steering knuckle pins. A steering knuckle pin angle of 8 deg. and a wheel camber of 1½ deg. are used so that the center line of the steering knuckle pin produced to the ground very nearly intersects the tire contact on the ground. Other features of the axle equipment are more or less similar to conventional axle practice, although specially designed for heavy-duty work and to accommodate themselves to the various new departures mentioned.

Proper Materials Handling a Factor in Safety

The importance of materials handling among manufacturers is obvious. Scarcely less apparent is the prominence which marks this consideration among the operating companies and particularly with respect to shop and maintenance practice. For these reasons it is well to recognize what an important and serious factor materials handling is in the present day accident problem. In itself it is responsible for about one-third of all industrial accidents in the country and approximately one-fourth of the lost time. The annual economic loss involved is estimated at \$250,000,000.

A number of pregnant suggestions on this subject were made by David S. Beyer in a paper which was presented at the annual meeting of the American Society of Mechanical Engineers in New York early in December. Among these were the substitution of mechanical handling of materials for manual handling



Special Type of Timken Axle for Use Under New Public Service Railway Buses

the Yellow Truck & Coach Manufacturing Company. It is constructed for underslung springs and Hotchkiss drive. The housing, or body of the axle, differs from ordinary practice in that it is a one-piece drop forging. Because of the dual electric motor drive, two driving units are necessary and two bowls must be provided to accommodate the two driving units. The underslung spring pads and the flanges for mounting the brake mechanism are forged integral, presenting a very difficult forging problem.

Special machine equipment was provided to build this double bowl banjo type of housing. The forging is bored to provide a housing for the axle shaft and also to provide a suitable mounting for the driving unit. This design provides an exceptionally strong rear member to withstand the exacting requirements of heavy-duty motor coach service.

The front axle was also designed especially for the Yellow Truck &

wherever possible, the provision of necessary mechanical protection and safe working arrangements, designing and purchasing new equipment and proper emphasis on the human element as represented by intelligent supervision of the work in progress to avoid unnecessary chance taking, proper selection of men for the job they are doing and prompt first aid measures for minor injuries.

Ever increasing attention is being given to this subject by manufacturers and operating companies in the electric railway field. It is a field of effort which pays big dividends in the long run due to the reduction in damage charges and insurance rates.

Traction Progress Reviewed

"Engineering Achievements for the Year 1925" is the title of a booklet recently issued by the Westinghouse Electric & Manufacturing Company. H. W. Cope, assistant director of engi-

neering, is the editor. As stated in the introduction, the purpose of the publication is to give credit where credit is due and to enumerate some of the outstanding achievements made by the engineering departments during the past year. Practically every phase of the engineering activities of the Westinghouse company is covered and considerable attention is given to developments in railway traction, self-propelled cars and locomotives, such as the gas-electric and oil-electric, and to the many improvements in the gas-electric bus.

Date Set for Submission of Bids on B.-M. T. Cars

Feb. 15 has been specified as the final date for submitting of bids on 67 triplex car units for the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y. As reported previously in the *ELECTRIC RAILWAY JOURNAL*, approval was secured on Dec. 17 from the New York Transit Commission of the general plans and type of triplex units which have been in operation for the last three months. The cost of the 201 cars or 67 triplex units is estimated between \$4,000,000 and \$5,000,000. After the bids have been received they will be submitted to the Transit Commission for its approval of the award and the contract and the plan for financing under which payment will be made for the cars.

Some New Haven Equipment on Order

The New York, New Haven & Hartford Railroad expects to receive about March 1 the seven electric locomotives ordered some time ago from the General Electric Company. Five of these are freight electrics and two are electric switchers. In addition there is on order at the present time by the New Haven the following electric equipment: 25 multiple-unit motor cars, Osgood-Bradley; 37 multiple-unit trailers, Osgood-Bradley; three electric switchers, Westinghouse Electric & Manufacturing Company, and five 73-foot combination passenger and baggage gas-electrics, J. G. Brill Company.

It is probable that the gas-electric rail cars will be used on various branch lines where traffic is comparatively light.

Metal, Coal and Material Prices

Metals—New York		Jan. 19, 1926
Copper, electrolytic, cents per lb.	14.10	
Copper wire base, cents per lb.	15.00	
Lead, cents per lb.	9.25	
Zinc, cents per lb.	8.65	
Tin, Straits, cents per lb.	61.75	
Bituminous Coal f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.	\$4.975	
Somerset mine run, Boston, net tons.	2.125	
Pittsburgh mine run, Pittsburgh, net tons	2.05	
Franklin, Ill., screenings, Chicago, net tons	1.875	
Central, Ill., screenings, Chicago, net tons.	1.425	
Kansas screenings, Kansas City, net tons	2.30	
Materials		
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	\$7.00	
Weatherproof wire base, N. Y., cents per lb	15.25	
Cement, Chicago net prices, without bags	2.10	
Linseed oil (5-bbl. lot), N. Y., cents per lb.	11.90	
White lead in oil (100-lb. keg), N. Y., cents per lb.	15.50	
Turpentine (bbl. lot), N. Y., per gal.	\$1.03	

Farewell Party for E. R. Fitch

Ellery R. Fitch, for the last five years district engineer of the Westinghouse Air Brake Company, Westinghouse Traction Brake Company and the Safety Car Devices Company, located in St. Louis, has been transferred to New York City in a similar capacity. Mr. Fitch leaves a host of friends in St. Louis, and to show their appreciation they gathered on Dec. 31 and presented to him a handsome watch, chain and knife. An inscription on the back of the watch reads: "To a Regular Fellow, from the St. Louis Gang, 1925."

Twenty members of "the gang" also proceeded to "say it with poetry" and presented a framed testimonial of affection to their erstwhile comrade.

Rolling Stock

Georgia Railway & Power Company, Atlanta, Ga., has purchased five modern, low-step interurban cars for use between Atlanta and Stone Mountain, Ga. The cars will cost approximately \$18,000 each.

Penn-Ohio System, Youngstown, Ohio, has authorized an appropriation for ten freight trailers designed according to specifications recently adopted by the master mechanics of the Central Electric Railway Association. The order for these cars will be placed with the Kuhlman Car Company at an approximate cost of \$3,500 each.

Columbus, Delaware & Marion Electric Company, Columbus, Ohio, is securing two new chair cars for operation between Marion and Columbus. These cars are 62 ft. in length over all, all steel construction, weigh 51 tons each and have a speed of 75 miles an hour. They are parlor cars and incorporate all the latest equipment, windows being plate glass set in bronze frames and counter-balanced. Each window is 4 ft. in width and 2½ ft. long, equipped with a storm sash and hinged so that the windows may be washed. The rear platform of these cars is inclosed and has a door in the center of the car with a French window on either side, making an observation platform, and at the same time eliminating the entrance of dust. The main bodies of these cars will seat 27 persons and the smoker will accommodate eight persons. The cars are electrically heated and are equipped with both hot and cold water. The electrical equipment consists of four 145-hp. motors with helical gears and pinions to eliminate noise.

Trade Notes

J. H. Mahler recently joined the Electric Service Supplies Company, Philadelphia, as bus specialist. After serving in the World War Mr. Mahler completed the test course of the General Electric Company at Schenectady, N.Y., and the electrical engineering extension course at Union College, Schenectady, N. Y. He was connected with the research laboratory and Dr. Steinmetz for two years during the development of the lightning generator and high-

voltage insulation tests; later Mr. Mahler joined the air brake engineering department of the General Electric Company at Erie, Pa.

Albert S. Richey, electric railway engineer of Worcester, Mass., has had reprinted for distribution his article "Electric Railway Costs and Fares Continue Stable in 1925," published in the *ELECTRIC RAILWAY JOURNAL*, issue of Jan. 2, 1926.

Donald J. Roder, formerly with the Michelin Tire Company, has joined the New York sales force of the India Tire & Rubber Company, covering the territory around Syracuse. Mr. Roder was with the Michelin company for the last twelve years. He is well known in the Syracuse territory.

Okonite Company, Passaic, N. J., has opened a new office on the Pacific Coast. The new quarters, which will also be shared by the Okonite-Callender Cable Company, Inc., are located in the Hoge Building, corner of Second Avenue and Cherry Street, Seattle, Wash. This office, in connection with the branches already established in San Francisco and Los Angeles, places Okonite products and service within immediate reach of buyers all along the coast.

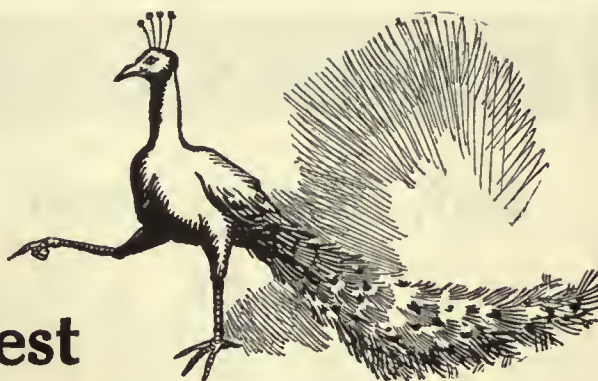
New Advertising Literature

Rome Wire Company, Rome, N. Y., is publishing a series of bulletins dealing individually with every type of wire. The first two, dealing with magnet wire and super service cord, have been widely distributed. The third, dealing with bare wire, is now ready for distribution. This bare wire catalog contains data and tables regarding construction, sizes, weights, current-carrying capacities and makes a handy book for reference. The Rome Wire Company will gladly send copies of any of these bulletins to those who express a wish for them.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued leaflet 20266 on "The Articulated Car of the B.-M. T. Lines, Rapid Transit Division." This four-page leaflet, attractively presented in two colors, illustrates the important electrical equipment, includes the wiring diagram of the articulated car and in addition to a complete description of the motor equipment and accessories elaborates on the importance of this equipment as representing the latest development for rapid transit service.

Dayton Mechanical Tie Company, Dayton, Ohio, has a booklet setting forth the advantages of mechanical tie equipment for use in paved streets. As stated in the foreword of the pamphlet, the purpose has been to show by the history of street railway tracks where wood ties have failed and why, and how these failures have suggested their own cure. The Dayton tie was evolved to obviate the failures resulting from the older type of equipment. Numerous illustrations are included in the booklet showing instances where Dayton tie equipment has been in service over a period of years with excellent results. Various costs and operation data on the mechanical ties are included.

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143 Crary Ave., Mt. Vernon, N. Y.

Transmission Line and Special Crossing Structures, Catenary Bridges

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THE P. EDWARD WISH SERVICE

59 Church St.	Street Railway Inspection	131 State St.
NEW YORK	DETECTIVES	BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we all differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we built. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

ROOTLife Guards
Snow Scrapers

Remove Snow as it falls—with Root Scrapers.

Root Spring Scraper Co.

Kalamazoo, Mich.

Big Results from Little Ads

The advertisements in the Searchlight Section are constantly bringing together those who buy, sell, rent or exchange.

They convert idle commodities into useful cash, idle cash into useful commodities, and that which you have but don't want into that which you want but don't have.

The cost is a trifle, the results considerable.

0059

Get Your Wants into the Searchlight

PAXSON
Switch and Frog
BROOMS

Wire or Rattan

J. W. PAXSON CO.
Philadelphia, Pa.**CHUP**

From the call of certain birds the Kayans interpret the success or failure of an undertaking.

When the cry of a bird of ill omen is heard, it is their custom to beat gongs loud enough to chup, or drown out, all other sounds.

Trying to kid yourself into thinking that all is well when the symptoms cry *trouble*, gets you into such funny situations as lubricating a commutator when it starts to whistle.

That silences the squeak, but the ill-chosen brush that started the trouble is the same old trouble maker.

The cry of the commutator was for Morganite.

Morganite
Brush Co., Inc.

Main Office and Factory

519 West 39th St., New York

DISTRICT ENGINEERS AND AGENTS

Pittsburgh, Electrical Engineering & Mfg. Co., 909 Penn Ave.

Cincinnati, Electrical Engineering & Mfg. Co., 607 Mercantile Library Building.

Cleveland, Electrical Engineering & Mfg. Co., 422 Union Building.

Baltimore, O. T. Hall, Sales Engineer, 437-A Equitable Building

Revere, Mass., J. F. Drummey, 75 Pleasant Street.

Los Angeles, Special Service Sales Co., 502 Delta Building.

San Francisco, Special Service Sales Co., 202 Russ Building.

Toronto, Can., Railway & Power Engineering Corp., Ltd., 101 Eastern Ave.

Montreal, Can., Railway & Power Engineering Corp., Ltd., 326 Craig St., West.

Winnipeg, Can., Railway & Power Engineering Corp., Ltd., P. O. Box 325.

ANNUAL MAINTENANCE NUMBER

March 20, 1926

The time—the place—and the goal!

IN THE earliest stages of spring—when interest in the new car movement is at its height—this is indeed an opportune *time* for a special message to the electric-railway field.

The advertising pages of the Annual Maintenance Number of ELECTRIC RAILWAY JOURNAL afford the most effective display space in which to *place* such a message. They reach the railway officials who buy, and those whose opinions influence buying. They are supplemented by editorial pages and articles concerning modern maintenance methods for every department.

Thorough modernization of rolling stock, rehabilitation of track and special-work together with up-to-date machinery for maintenance, is the *goal* at which the railway field is aiming. If you tie-in the copy appeal with this theme, your message will be most effective.

Our Advertising Service Department will be pleased to offer copy suggestions in line with present tendencies in the field. No obligation or charge involved.

ELECTRIC RAILWAY JOURNAL

(A McGraw-Hill publication)

Tenth Avenue at 36th Street
New York, N. Y.

Member ABC

Member ABP



Car by Osgood Bradley Car Co. for Scranton Street Railway.

The Modern Street Cars Call for EDWARDS Metal Sash

Modern street cars must be light in weight, but sturdy. Edwards Metal Sash is light and sturdy, and permits the lightest of car construction.

Modern street cars must be neat in appearance, permitting ample vision, and bright with daylight. Edwards Metal Sash gives a trim appearance to the whole car. It is narrow, and calls for only the narrowest of posts.

Edwards Metal Sash gives a maximum of glass area. Edwards Metal Sash insures windows that are easily opened and safely closed. The windows can't rattle and can't leak air.

Inexpensive to install, the maintenance of Edwards Metal Sash is practically nothing. It will outlive the car itself.

Can be installed by any car builder. Surely worth investigating. Write for detailed information.

Edwards Storm Sash—
for any type of car—
helps solve heating
problems.

Edwards Screen Sash—
for interurban cars
and motor coaches



No lock racks are required for Edwards Metal Sash. Note the neatness and simplicity. Constructed of fine spring brass, with satin finish.

O. M. EDWARDS CO.

SYRACUSE, N.Y.

Canadian Representatives: LYMAN TUBE AND SUPPLY CO., Montreal and Toronto

For 39 Years Makers of Window Equipment for Steam and Electric Railways



Collier Service

A nation-wide
organization
building and
sustaining car
card advertising
space values



Barron G. Collier, Inc.

Candler Bldg.
New York

PUBLICITY

How to plan it—how to use it—how to make it pay

ARE you using every avenue of publicity to good advantage for your company? Are you keeping your public in the right frame of mind toward your service? Are the people of your community informed as to your side of important questions?

In every public utility company there is one man on whose shoulders the burden rests for the satisfactory accomplishment of this work.

The publicity executive of any utility never has had a larger task than now—at the same time never have the opportunities been greater—and certainly never before has such a helpful guide been available as this new practical library now offered for the first time.

New methods—new procedure—new developments—new problems

The **LIBRARY OF PRACTICAL PUBLICITY**—For Public Utility Men—covers the entire field of publicity effort from newspapers to the public platform and radio broadcasting. It discusses not only methods of using publicity on different problems but the problems as well. It takes up every tried and tested publicity method. It explains every public utility point at all in dispute, every problem threatening the business and every possible contact which can be made with interested or disinterested public. It shows what to do and what to avoid. No more valuable publicity library has ever been offered anywhere. No publicity executive concerned at all with the publicity work of his company should be without it.

Send
no
money

If the
advancement
of any public
utility is
your job
—these are
your books
Examine them
FREE

Library of PRACTICAL PUBLICITY for Public Utility Men

4 Vols.—1126 pages—well illustrated
\$12.00, payable \$2.00 in 10 days
and \$2.00 a month

The practical methods and suggestions in these four books are worth dollars and cents to any public utility executive. Complete information is given on planning and placing publicity, preparing newspaper and magazine stories, using the radio, using conven-

tions, arranging banquets, speaking in public to good effect, getting your story across in moving pictures and every other element entering into modern publicity efforts.

Rates? Service? Competition? Customer Ownership? Legal Obstructions? Complaints?

One complete volume is devoted to the economics of public utilities. It presents the business side of every important utility problem. It explains the fundamental reasoning underlying the public utility's position. It discusses franchises, capitalization, regulation, valuation, rates, utility development, public ownership, public relations, extensions of property, coordination of local transportation, labor-saving devices, power factor, meter testing, superpower, etc.

Another volume is devoted to customer relations. A third covers public speaking. The fourth explains publicity methods.

No more complete coverage of public utility publicity has ever been given. The library is of unlimited value to any utility company.

A few of the thousands of subjects covered

- What the newspapers want;
- The needs of different newspaper departments;
- What the 700 leading newspapers are;
- What the opportunities on the public platform are;
- How to run a public banquet;
- How to run a convention;
- How to organize a complete publicity campaign, with separate consideration for corporations, associations, retail stores, individuals, etc.;
- What the general magazines want;
- How to use radio for publicity;
- How to use motion pictures for publicity;
- How to make your public understand your problems;
- How to plan and deliver a speech;
- How to explain your side of regulation;
- How to increase sales;
- How to promote good will;
- How to develop proper organization spirit;
- How to get employees to cooperate;
- How to create internal publicity units;
- How to promote security sales;
- And many other useful ideas.

Examine the books yourself for 10 days

Mail just the coupon and we will send the Library to you for 10 days' free examination. No obligation to purchase—no agents—no red tape. You merely agree to return the books, postpaid, in ten days or to send you first payment of \$2.00 at that time. The balance is payable \$2.00 a month.

This means but seven cents a day for a Library worth many times that small sum to you in your publicity work.

Mail the coupon today.

Examine
it for
10 days
FREE

Mail just
this coupon

McGraw-
Hill Book
Co., Inc.,
370 Seventh
Avenue,
New York.

Send me the LIBRARY OF PRACTICAL PUBLICITY for 10 days' free examination. If satisfactory, I will send \$2.00 in 10 days and \$2.00 monthly until the complete price, \$12.00, has been paid. If not wanted I will return the books, postpaid, within 10 days of receipt.

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Address.....

Position.....

Company..... E. 1-23-20

Only
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day



BRAKE SHOES

AERA Standards
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Diamond "S" Steel Back and Lug Shoes
best for all equipment.

Manufactured and sold under U. S.
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American Brake Shoe and Foundry Co.
30 Church Street, New York
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You're having brush trouble
CORRECT IT

USE LE CARBONE CARBON BRUSHES

They talk for themselves

**COST MORE PER BRUSH
COST LESS PER CAR MILE**

W. J. Jeandron

Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.

Pittsburgh Office: 634 Wabash Bldg.

Chicago Office: 1657 Monadnock Block

San Francisco Office: 525 Market Street

Canadian Distributors: Lyman Tube & Supply Co., Ltd.,
Montreal and Toronto

*Quality is remembered
when price is long
forgotten.*

*That's why "Tool Steel"
gears and pinions are
increasingly popular.*

Tool Steel Quality

**The Tool Steel
Gear and Pinion Co.**

CINCINNATI, O.

The DIFFERENTIAL CAR



**Standard on
60 Railways for**

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

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H. A. HEGEMAN, Vice-Pres. and Treas. F. T. SARGENT, Secretary
W. C. PETERS, Manager Sales and Engineering

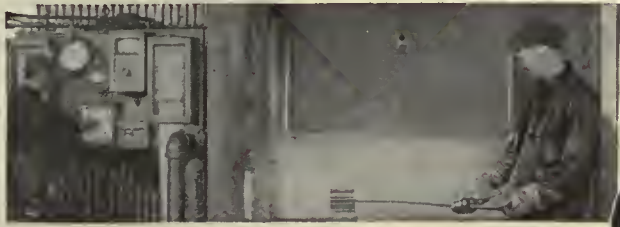
National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York
Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Bell Locked Fare Box and Change
Maker
The Aluminum Field Coils
Walter Tractor Snow Plows
Cutler-Hammer Electric Heaters
Genesco Paint Oils
Garland Ventilators
Flaxlinum Insulation
Yellow Coach Mfg. Co.'s Single
and Double Deck Busses.
B. G. Spark Plugs

Economy Electric Devices Co.'s
Power Saving and Inspection
Meters
Anglo-American Varnish Co.,
Varnishes, Enamels, etc.
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Ft. Pitt Spring & Mfg. Co.,
Springs
Anderson Slack Adjusters
Feasible Drop Brake Staffs
Dunham Hopper Door Devices



We do not know of any Heat Treatment as careful and thorough, nor any inspection as complete and rigid as we apply to all Nuttall Gearing. We do not know how to make Nuttall Gears any better, though we are trying every day.

R.D. NUTTALL COMPANY
PITTSBURGH  PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.



Air Where You Need It—Quick



Sullivan "WK-312" Compressor with Skid Mounting on Ford Truck

Other Sullivan Portable Compressors are mounted on steel wheels or on trailer trucks with rubber tires

For any outdoor job, drilling rock, breaking concrete, digging clay, riveting steel, sand blasting or painting, this

Ford-Mounted Sullivan "WK-312,"

110-ft. Compressor

affords maximum portability and convenience.

The machine, on skids, is bolted right to the truck frame, complete with gas and air tanks and full equipment.

"Wafer" air valves, automatic, power-saving unloader, ample water circulation and automatic lubrication are dependability guarantees.

Get free Bulletin No. 3277-N

SULLIVAN MACHINERY COMPANY
150 SOUTH MICHIGAN AVENUE  CHICAGO, ILLINOIS U.S.A.

"The Standard for Rubber Insulation"

INSULATED WIRES and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

Send for Handbook

The Okonite Company

The Okonite-Callender Cable Company, Inc.

Factories, PASSAIC, N. J.

PATERSON, N. J.

Sales Offices: New York Chicago Pittsburgh St. Louis
Atlanta Birmingham San Francisco
Los Angeles



Pettingell-Andrews Co., Boston, Mass.
F. D. Lawrence Electric Co., Cincinnati, O.
Novelty Electric Co., Phila., Pa.
Canadian Representatives:
Engineering Materials Limited, Montreal.

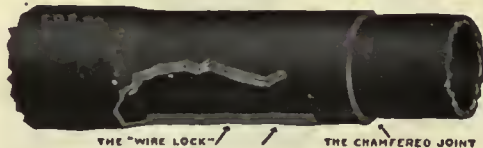


*The Hardware makes the line
Hubbard makes the Hardware*



Hubbard and COMPANY
PITTSBURGH • OAKLAND, CAL. • CHICAGO

ELRECO TUBULAR POLES



COMBINE

Lowest Cost
Least Maintenance

Lightest Weight
Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO

New York City, 30 Church Street

THE WORLD'S STANDARD

"IRVINGTON"

Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.

Sales Representatives in the Principal Cities



AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE

TROLLEY WIRE

**WEATHERPROOF WIRE
AND CABLE**

**PAPER INSULATED
UNDERGROUND CABLE**

MAGNET WIRE

Reg. U. S. Pat. Office

Incandescent Lamp Cord

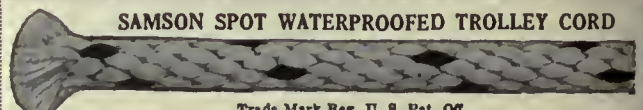
AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Boston, 176 Federal; Chicago, 113 W. Adams;
Cincinnati, Tracilon Bldg.; New York, 100 E. 42nd St.



Standard Underground Cable Co.

BOSTON PHILADELPHIA PITTSBURGH DETROIT
NEW YORK WASHINGTON CHICAGO ST. LOUIS SAN FRANCISCO



SAMSON SPOT WATERPROOFED TROLLEY CORD

Trade Mark Reg. U. S. Pat. Off.

Made of extra quality stock firmly braided and smoothly finished.
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.

SAMSON CORDAGE WORKS, BOSTON, MASS.



**ANACONDA
TROLLEY WIRE**

ANACONDA COPPER MINING COMPANY
THE AMERICAN BRASS COMPANY

Rods, Wire Cable Products

NEW YORK

CHICAGO

**Chapman
Automatic Signals**
Charles N. Wood Co., Boston



AUTOMATIC SIGNALS
Highway Crossing Bells
Headway Recorders
Flasher Relays

NACHOD SIGNAL COMPANY, INC.
LOUISVILLE, KENTUCKY.



ROEBLING

WELDING CABLE

ELECTRICAL WIRES and CABLES
John A. Roebling's Sons Company, Trenton, N. J.

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of
Water Tube Boilers
of continuing reliability

BRANCH OFFICES

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PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candier Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building



WORKS
Bayonne, N. J.
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Makers of Steam Superheaters
since 1898 and of Chain Grate
Stokers since 1893

BRANCH OFFICES

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HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 435 Seventeenth Street
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SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

-Carnegie-

the name
to look for
on Steel

CARNEGIE STEEL COMPANY
PITTSBURGH - PENNA.

Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

American Steel & Wire Company

Chicago
New York

Boston
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Denver

San Francisco

U. S. Steel Products Co.
Los Angeles

Portland

Seattle



Two points to note— “Ideal” Trolley Wheels

—have light soft-stamped steel flanges to take the buffeting of the wire at high or low speeds without undue wear—and an integral cast copper-tin alloy contact ring and hub to give minimum electrical resistance quite independent of the steel flanges. Leading manufacturers of electric railway equipment endorse them.

Sales Representatives

R. D. Nuttall Co.
Pittsburgh, Pa.
Also all Westinghouse
E. & M. Co. and
General Electric Co.
District Offices.

Get full particulars—also sample for comparison with other wheels.

Edward P. Sharp

L. E. Harmon, Prop.
27-31 Mechanic St., Buffalo, N. Y.

LUDLUM

Tool Steel

Utica

THE MASTER HEAVY DUTY STEEL
FOR PRESS TOOLS, COMPLICATED SHAPES,
TAPS AND REAMERS.
WRITE FOR OUR INTERESTING BOOK
ON TOOL STEELS.
LUDLUM STEEL COMPANY
WATERVLIET - N.Y. - U.S.A.
WE HAVE A SPECIAL TOOL STEEL
FOR EVERY SPECIFIC PURPOSE.



WHARTON

Special Trackwork
for Electric Railways
Using the famous
TISCO MANGANESE STEEL
exclusively!

Wm. Wharton Jr. & Co. Inc.
Easton, Pa.

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY

Johnstown, Pa.

Sales Offices:

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Pacific Coast Representative:
United States Steel Products Company
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100 New Users in the Last Nine Months
KASS SAFETY TREADS
 HIGH
 in efficiency and lasting qualities
 LOW
 in weight, initial and upkeep costs
 Morton Manufacturing Co., Chicago

THE BEST TRUSS PLANE ELECTRIC HEATER EVER PRODUCED



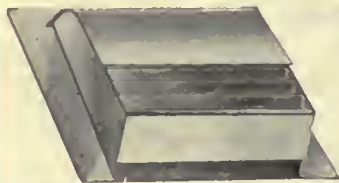
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478E

GOLD CAR HEATING & LIGHTING CO., BROOKLYN, N. Y.

RAIL GRINDERS AND WELDERS

Railway Track-work Co., Philadelphia

682



N-L Ventilators
 for Cars and Buses



The Nichols-Lintern Co.
 Cleveland, Ohio

NAUGLE POLES
 WESTERN & NORTHERN CEDAR
NAUGLE POLE & TIE CO.
 59 E. MADISON ST. CHICAGO ILL.
 New York • Columbus • Kansas City • Spokane • Vancouver • Boston



Car Heating and Ventilation

are two of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

The Peter Smith Heater Company
 6209 Hamilton Ave., Detroit, Mich.

Northern **CEDAR POLES** Western
 We guarantee
 all grades of poles; also any butt-treating specifications
BELL LUMBER COMPANY
 Minneapolis, Minn.



GODWIN Steel Paving Guards

Proven by service to economically prevent seepage and disintegration of street railway paving.

Write for Illustrated Catalog No. 20

W. S. GODWIN CO., Inc.
 Race and McComas St., Baltimore, Md.

SEVEN WORKS RAMAPO-AJAX-ELLIOT
 HILLBURN NEW YORK
 NIAGARA FALLS, N.Y.
 CHICAGO, ILLINOIS
 EAST ST. LOUIS, ILL.
 FUELLE, COLORADO
 SUPERIOR, WISCONSIN
 NIAGARA FALLS, ONT.
 CANADA

Ramapo Ajax Corporation

RAMAPO AUTOMATIC RETURN SWITCH STANDS FOR PASSING SIDINGS
TEE RAIL SPECIAL WORK
MANGANESE CONSTRUCTION
 SALES OFFICES AT ALL WORKS
 Main Office, HILLBURN, N.Y.

Our advertisement in the issue of January 16 showed how

HASKELITE and PLYMETL

have produced a new type of car construction.
 Another ad will appear next week.

HASKELITE MANUFACTURING CORPORATION
 133 W. Washington St., Chicago, Ill.



STUCKI SIDE BEARINGS

A. STUCKI CO.
 Oliver Bldg.
 Pittsburgh, Pa.

PROVIDENCE FENDERS

H-B LIFE GUARDS

The Consolidated Car Fender Co., Providence, R. I.

Wendell & MacDuffie Co., 110 E. 42nd St., New York
 General Sales Agents



CHILLINGWORTH

One-Piece Gear Cases
 Seamless—Bivetless—Light Weight
 Best for Service—Durability and Economy. Write Us.

Chillingworth Mfg. Co.
 Jersey City, N. J.

"Axle Specialists Since 1868"
 Address all Mail to Post Office Box 515, Richmond, Va.

CAR AXLES **J. R. JOHNSON AND CO., INC.** FORGED STEEL AXLES

For Locomotives, Passenger, Freight and Electric Cars
 Smooth Forged or Rough Turned—Carbon or Alloy Steel—Plain or Heat Treated, Forged and Turned Piston Rods, Crank Pins, Large Shafts, Round Bars, etc.



Eliminate rail joints
 by

THERMIT-WELDING
 METAL & THERMIT CORPORATION
 120 Broadway, New York City, N.Y.

RAILWAY UTILITY COMPANY

CAR COMFORT WITH
UTILITY

HEATERS
 REGULATORS
 VENTILATORS

141-151 West 22d St.
 Chicago, Ill.

Write for Catalogue

1328 Broadway
 New York, N. Y.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.
Positions Vacant and all other classifications, 8 cents a word, minimum charge \$2.00.
Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.
 Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....\$4.50 an inch
 4 to 7 inches.....4.30 an inch
 8 to 14 inches.....4.10 an inch
 Rates for larger spaces, or yearly rates, on request.
 An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

POSITIONS WANTED

ELECTRIC railway engineer, 25 years' experience, desires new connection, as general manager or assistant in operating field. Previous experience has been with two of the largest electric railways in U. S. One combined city and interurban, other in very large city. PW-877, Electric Railway Journal, Tenth Ave. at 36th St., New York.

SUPERINTENDENT transportation, qualified by a wide experience and successful record on large city and interurban properties; successful in handling labor. Public relations, safety campaigns, etc., recognized as an efficient, progressive official fully capable of getting results. At present engaged. Personal reasons for desiring change. High-class references from leading executives. Correspondence invited. PW-858, Electric Railway Journal, 401 Guardian Bldg., Cleveland, Ohio.

WANTED

Young Electrical Engineer

25-30 years old, experienced street railway equipment installation, research, and operation, preferably from manufacturer's end, for similar work by prominent bus manufacturer. Give age, family circumstances, education, and details of employment and experience in order by date, also references and inexpensive photograph.

P-878, Electric Railway Journal Leader-News Bldg., Cleveland, O.

Attention—Buyers

FOR SALE APPROXIMATELY

4000 tons of 70 lb. ASCE first class Steel Rail and Angle Bars, 30-ft. lengths.

Approximately 1000 tons of same class of Rails, 60-ft. lengths.

ROTARY CONVERTERS

300 K.W. Westinghouse, 600 v. D.C., 6 ph., 60 cy., 1200 R.P.M. with 33,000 v. step down transformers complete with panel boards and instruments.

Bronze trolley ears, steel pole brackets, etc.

Thousands of poles and ties.

Immediate Shipments

Get in touch with us now

HYMAN-MICHAELS CO.

Peoples Gas Bldg., Chicago

When Writing Your Ad

Provide an indexing or subject word.

Write it as the first word of your ad.

If it is a Position Wanted or Position Vacant ad, make the first word the kind of position sought or offered.

This will assure proper classification in the column. The right is reserved to reject, revise or properly classify all Want Advertisements.

*Proper Classification
increases the possibility of
Prompt Returns*

0301

FOR SALE

30 Birney Safety Cars

Brill Built

West. 508 or G. E. 264 Motors. Cars Complete—Low Price—Fine Condition.

ELECTRIC EQUIPMENT CO.

Commonwealth Bldg., Philadelphia, Pa.

TO HELP YOU

FIND A NEW OR BETTER JOB

"Searchlight" Advertising

G-5

4 High Grade, High Speed, 56 PASSENGER COMBINATION (Smoking and Baggage) CARS

Exceptionally Good for Interurban Service All in excellent condition. Built by Kuhlman. Length over all, 57 ft. Height over trolley board, 12 ft. 5 in. Height over all, 13 ft. 10 in. Number of seats, 26. Type of motors, four G. E. 205. Make of trucks, Brill. Wheel base, 7 ft. Controller, G.E.—MC—74. Toilets, 34x36-in. Air Compressor, WH-D-2. For illustration of these cars, see our advertisement in the January 2nd issue of this publication. Watch for advertisement in January 30th issue, offering other types of cars.

J. W. GERKE, Railway Equipment
303 Fifth Ave., New York City

SOME ONE WANTS TO BUY

the equipment or machinery that you are not using. This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards.

SELL IT BEFORE DEPRECIATION SCRAPS IT

THE SEARCHLIGHT SECTION IS HELPING OTHERS
—LET IT HELP YOU ALSO

0079

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry
with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Receivers & Aftercoolers
Ingersoll-Rand Co.

Anchor, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch
Stands
Ramapo Ajax Corp.

Automatic Safety Switch
Stands
Ramapo Ajax Corp.

Axles
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Johnson & Co., J. R.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson, J. R.

Axles, Car Wheel
Bethlehem Steel Co.

Axles, Steel
Carnegie Steel Co.
Johnson, J. R.
Ludlum Steel Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co., The

Bearings and Bearing Metals
Brill Co., J. G., The
General Electric Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller
Slide
Stueki Co., A.

Bells and Gongs
Brill Co., The J. G.
Consolidated Car Heat. Co.
Elec. Service Supplies Co.

Bodies, Bus
Auto Body Co.
Cummings Car & Coach Co.
Graham Bros.
Long Body Co.

Body Material, Haskellite and Plymet
Haskellite Mfg. Corp.

Bollers
Babcock & Wilcox Co.

Bond Trailers
American Steel & Wire Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Book Publishers
McGraw-Hill Book Co.

Brackets and Cross Arms
(See also Poles, Ties, Posts, Etc.)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Br. Shoe & Fdy. Co.
Remis Car Truck Co.
Brill Co., The J. G.

Brakes, Brake Systems and Brake Parts
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Westinghouse Tr. Br. Co.

Brooms, Wire & Rattan
Faxon Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbones Co.
Morganite Brush Co.
Westinghouse E. & M. Co.

Brushes, Graphite
Morganite Brush Co., Inc.

Brushes, Wire Pneumatic
Ingersoll-Rand Co.

Busheads
Haskellite Mfg. Corp.

Bus Seats
Bender Body Co.
Hale-Kilburn Co.
S. Karpen & Bros.

Buses, Motor
Brill Co., The J. G.
Mack Trucks
Six Wheel Co.

Bushings, Case Hardened and Manganese
Brill Co., The J. G.

Cables, (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Cars, Dump
Brill Co., J. G., The
Differential Steel Car Co.

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Passenger, Freight, Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co.

Cars, Gas, Rail
Brill Co., J. G., The

Cars, Second Hand
Electric Equipment Co.
Transit Equipment Co.

Cars, Self-Propelled
Brill Co., J. G., The
General Electric Co.

Castings, Gray Iron and Steel
Wm. Wharton, Jr. & Co.

Castings, Malleable and Brass
Amer. Br. Shoe & Fdy. Co.
Horne & Ebling Corp.

Catchers and Retrievers, Trolley
Driver-Harris Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskellite Mfg. Corp.
Pantastote Co., Inc.

Ceilings, Plywood, Panels
Haskellite Mfg. Co.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Root Spring Scraper Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coll Banding and Winding Machines
Elec. Service Supplies Co.

Colls, Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

Colls, Choke and Kieking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.
Intern'l Register Co.
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compounds (Insulating and Splicing)
Johns-Manville, Inc.

Compressors, Air
General Electric Co.
Ingersoll-Rand Co.
Sullivan Machinery Co.
Westinghouse Tr. Br. Co.

Compressors, Gas
Sullivan Machinery Co.

Compressors, Portable
Ingersoll-Rand Co.
Sullivan Machinery Co.

Concrete Flooring Surface
Irving Iron Works

Condensers
General Electric Co.
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

Copper Wire
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Steel & Wire Co.

Cord, Bell, Trolley, Register
Brill Co., The J. G.
Elec. Service Supplies Co.
Internat'l Register Co., The

Cord, Roebing's Sons Co., John A.

Cord Connectors and Connectors
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing, Frog & Switch
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Edwards Co., Inc., The O. M.
Morton Mfg. Co.
Pantastote Co., Inc.

Denier's Machinery & Second Hand Equipment
Elec. Equipment Co.
Gerke, J. W.
Hyman-Michaels

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Web-Serv. Co., P. Edward

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heat. Co.
General Electric Co.
Nat'l Pneumatic Co., Inc.
St. Louis Car Co.

Doors & Door Fixtures
Brill Co., The J. G.
Consolidated Car Heat Co.
Edwards Co., Inc., The O. M.
Hale-Kilburn Co.
General Electric Co.
Morton Mfg. Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

Drills, Rock
Sullivan Machinery Co.

Drills, Track
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ingersoll-Rand Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.

Ears
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electrical Wires and Cables
Amer. Electrical Works Co.
Amer. Steel & Wire Co.

Electric Grinders
Railway Track-work Co.
Western Electric Co.

Electrodes, Carbon
Railway Track-work Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Track-work Co.
Una Welding & Bonding Co.

Enamel
Lucas & Co., John

Engineers, Consulting, Contracting and Operating
Allison & Co., J. S.
Archbold-Brady Co.
Beeler, John A.
Buchanan & Layng Corp.
Bureau of Commercial Economics, Inc.
Byleshy Co., H. M.
Day & Zimmermann, Inc.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLew
McClellan & Juokersfeld
Ong, Joe R.
Railway Audit & Inspection Co.
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stor & Webster
White Eng. Corp., The J. G.

Engines, Gas, Oil or Steam
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Exterior Side Panels
Haskellite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Johnson Fare Box Co.
Perey Mfg. Co.
Nat'l Ry. Appliance Co.

Fare Registers
Electric Service Supplies Co.
Ohmer Fare Register Co.

Fences, Woven Wire and Fence Posts
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Consolidated Car Fender Co.
Root Spring Scraper Co.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Colls (See Colls)

Flangeway Guards, Steel
W. S. Godwin Co., Inc.

Floodlights
Elec. Service Supplies Co.

Floor, Sub
Haskellite Mfg. Corp.

Floors
Haskellite Mfg. Corp.

Forgings
Brill Co., J. G., The

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Funnell Castings
Wm. Wharton, Jr. & Co., Inc.

Fuses and Fuse Boxes
Consolidated Car Heat. Co.
General Electric Co.
Westinghouse E. & M. Co.

Fuses, Refillable
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

Gas Producers
Westinghouse E. & M. Co.

Gas-Electric Cars
General Elec. Co.
Westinghouse E. & M. Co.

Gates, Car
Brill Co., The J. G.

Gear Blanks
Bethlehem Steel Co.
Brill Co., J. G., The

Gear Cases
Chillingworth Mfg. Co.
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Bethlehem Steel Co.
Electric Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
General Electric Co.
Westinghouse E. & M. Co.

Glider Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gong (See Bells and Gongs)

Greases (See Lubricants)

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Metal & Thermo Corp.
Railway Track-work Co.

Grinders, Portable
Railway Track-work Co.

Grinders, Portable Electric
Railway Track-work Co.

Grinding Bricks and Wheels
Railway Track-work Co.

Guard Rail Clamps
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

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Elec. Service Supplies Co.
Ohio Brass Co.

Hammers, Pneumatic
Ingersoll-Rand Co.

Harps, Trolley
Elec. Service Supplies Co.
Nuttall Co., R. D.
Star Brass Works

Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Headlining
Haskellite Mfg. Corp.
Pantastote Co., Inc.

Heaters, Car (Electric)
Consolidated Car Heat. Co.
Gold Car Heat. & Ltg. Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Helmetts, Welding
Railway Track-work Co.
Una Welding & Bonding Co.

Holsts, Portable
Ingersoll-Rand Co.
Sullivan Machinery Co.

Instruments Measuring, Testing and Recording
General Electric Co.
Westinghouse E. & M. Co.

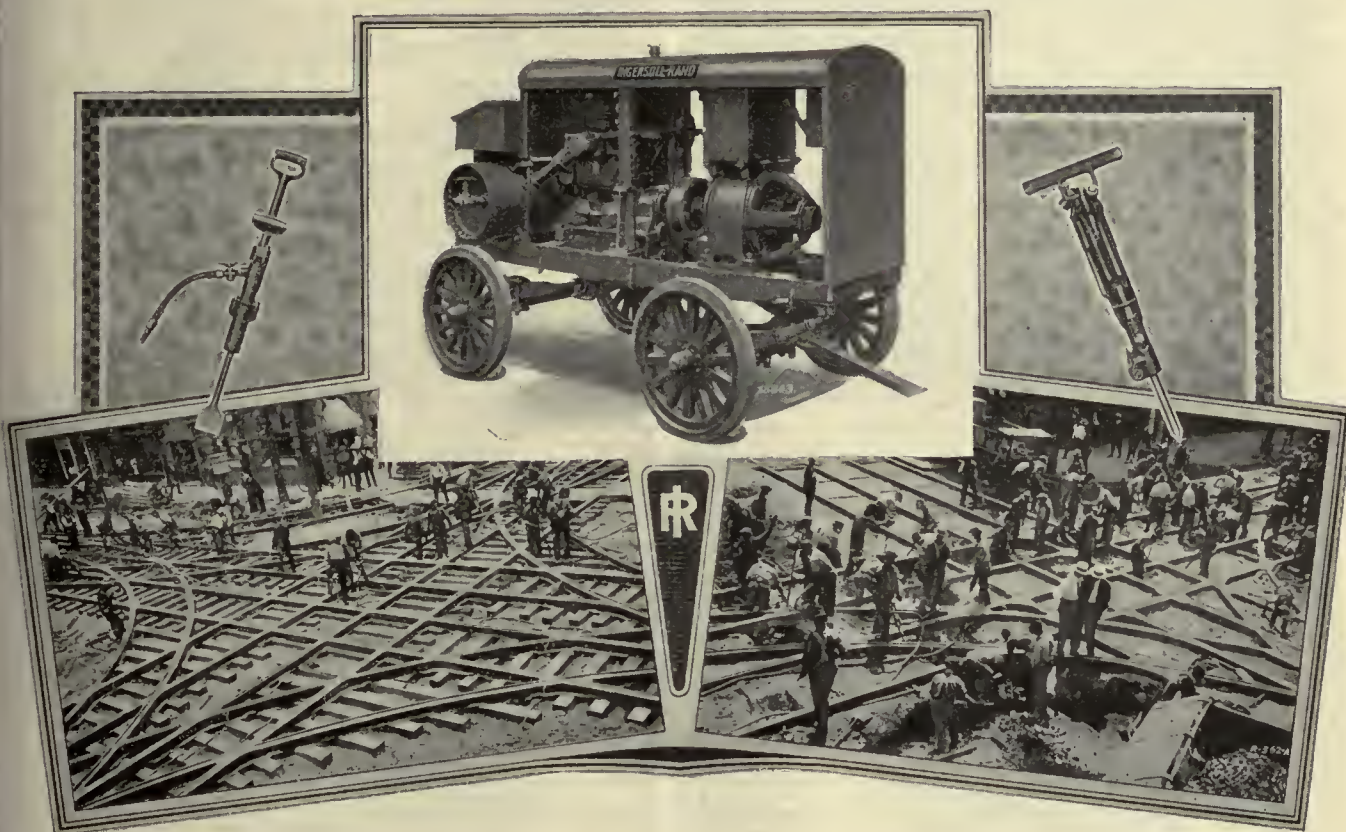
Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.

Insulation, Slits
Irvington Varnish & Ins. Co.

Insulators (See also Line Materials)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse E. & M. Co.

Pneumatic Tie Tampers and Paving Breakers



Two very effective means of reducing track work costs

Ingersoll-Rand Pneumatic Tie Tampers tamp track at less than half the cost of doing the job by hand methods. It has been definitely proved on dozens of roads that four men with pneumatic tampers will tamp more track, and do a better job, than 12 to 16 men using hand methods.

I-R Pneumatic "Paving Breakers" save from 60% to 75 % of the time and labor taken by hand methods in tearing up pavement or breaking out heavy concrete foundations.

Every road should include Tie Tampers and Paving Breakers in its equipment in order to take advantage of these savings on track work.

Ask for full details as to the savings made by these tools on other jobs.

INGERSOLL-RAND COMPANY-11 BROADWAY, NEW YORK CITY.

Offices in principal cities the world over

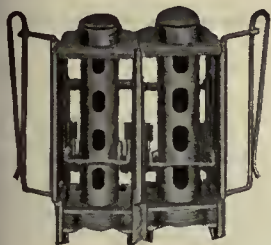
FOR CANADA REFER-CANADIAN INGERSOLL-RAND CO. LIMITED, 260 ST. JAMES STREET, MONTREAL, QUEBEC.

220 T.T.

Ingersoll-Rand

- Insulator Pins**
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- Jacks** (See also Cranes,
Hoists and Lifts)
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(See Rail Joints)
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- Junction Boxes**
Standard Underground
Cable Co.
- Lamps, Guards and Fixtures**
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General Electric Co.
Westinghouse E. & M. Co.
- Lamps, Arc and Incandescent**
(See also Headlights)
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Westinghouse E. & M. Co.
- Lamps, Signal and Marker**
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Nichols-Lintern Co.
Ohio Brass Co.
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- Lighting Protection**
Elec. Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Line Material** (See also
Brackets, Insulators,
Wires, etc.)
Archbold-Brady Co.
Electric Ry. Equipment
Co.
Elec. Service Sup. Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
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Electric Driven
Ingersoll-Rand Co.
- Locomotives, Electric**
Cummings Car & Coach Co.
General Electric Co.
St. Louis Car Co.
Westinghouse E. & M. Co.
- Lubricating Engineers**
Universal Lubricating Co.
- Lubricants, Oil and Grease**
Universal Lubricating Co.
- Manganese Steel Castings**
Wm. Wharton, Jr. & Co.,
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- Manganese Steel Guard Rails**
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
- Manganese Steel, Special**
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Wm. Wharton, Jr. & Co.,
Inc.
- Manganese Steel Switches,**
Frogs & Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
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- Motor Buses** (See Buses,
Motor)
- Motors, Electric**
General Electric Co.
Westinghouse E. & M. Co.
- Motors and Generators, Set**
Allis-Chalmers Mfg. Co.
General Electric Co.
- Motormen's Seats**
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Heywood-Wakefield Co.
Wood Co., Chas. N.
- Nuts and Bolts**
Bethlehem Steel Co.
Hubbard & Co.
- Oils** (See Lubricants)
- Omnibuses** (See Buses,
Motor)
- Oxy-Acetylene** (See Cutting
Apparatus, Oxy-Acetylene)
- Packing**
Westinghouse E. & M. Co.
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Electric Service Supplies Co.
Irvington Varnish & Ins. Co.)
- Paints and Varnishes for**
Woodwork
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Sullivan Machinery Co.
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W. S. Godwin Co., Inc.
- Paving Material**
Amer. Br. Shoe & Fdy. Co.
- Pickup, Trolley Wire**
Elec. Service Supplies Co.
Ohio Brass Co.
- Pinion Pullers**
Elec. Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.
- Pinions** (See Gears)
- Pins, Case Hardened, Wood**
and Iron
Ohio Brass Co.
Westinghouse Tr. Brake
Co.
- Pins, Wood and Iron**
Sharp, Edw. P.
- Pipe Fittings**
Westinghouse Tr. Brake Co.
- Planers** (See Machine Tools)
- Plates for Tee Rail Switches**
Ramapo Ajax Corp.
- Pliers, Rubber Insulated**
Elec. Service Sup. Co.
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Floors, Interior Panels,
Bulkheads, Truss Planks
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- Pole Line Hardware**
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Electric Service Supplies Co.
Ohio Brass Co.
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Elec. Ry. Equipment Co.
Hubbard & Co.
- Pole Reinforcing**
Hubbard & Co.
- Poles, Metal Street**
Bates Expanded Steel Truss
Co.
- Poles & Ties Treated**
Bell Lumber Co.
- Poles, Ties, Posts, Piling &**
Lumber
Bell Lumber Co.
Naugle Pole & Tie Co.
- Poles, Trolley**
Bell Lumber Co.
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Nuttall Co., R. D.
- Poles, Tubular Steel**
Elec. Ry. Equipment Co.
- Postheads**
Okonite Co.
Okonite-Callender Cable Co.,
Inc.
- Power Saving Devices**
National Ry. Appliances Co.
- Pressure Regulators**
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Pumps**
Ingersoll-Rand Co.
- Pumps, Air Lift**
Sullivan Machinery Co.
- Pumps, Vacuum**
Ingersoll-Rand Co.
- Pumps, Machinery Co.**
Sullivan Machinery Co.
- Punches, Turret**
Intern'l Register Co., The
Wood Co., Chas. N.
- Rail Braces and Fastenings**
Ramapo Ajax Corp.
- Rail Filler**
Phillip Carey Co.
- Rail Grinders** (See Grinders)
- Rail Joints**
Carnegie Steel Co.
Ludlum Steel Co.
- Rail Joints—Welded**
Lorain Steel Co.
Metal & Thermit Corp.
- Rail Welding**
Metal & Thermit Corp.
Railway Track-work Co.
Una Welding & Bonding Co.
- Rails, Relaying**
Hyman-Michaels
- Rails, Steel**
Bethlehem Steel Co.
Carnegie Steel Co.
Ludlum Steel Co.
- Railway Paving Guards,**
Steel
Godwin Co., Inc., W. S.
- Railway Safety Switches**
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.
- Rattan**
Brill Co., The J. G.
Cummings Car & Coach Co.
Elec. Service Supplies Co.
Hale-Kilburn Co.
- Registers and Fittings**
Brill Co., The J. G.
Elec. Service Supplies Co.
Intern'l Register Co., The
Ohmer Fare Register Co.
Rooke Automatic Register
Co.
- Reinforcement, Concrete**
Amer. Steel & Wire Co.
- Repair Shop Appliances** (See
also Cull Banding and
Winding Machines)
Elec. Service Supplies Co.
- Repair Work** (See also
Culls)
General Electric Co.
Westinghouse E. & M. Co.
- Replacers, Car**
Elec. Service Sup. Co.
- Resistances**
Consolidated Car Heat. Co.
- Resistance, Wire and Tube**
American Steel & Wire Co.
General Electric Co.
Westinghouse E. & M. Co.
- Retrievers, Trolley** (See
Catchers and Retrievers,
Trolley)
- Rheostats**
General Electric Co.
Westinghouse E. & M. Co.
- Roofing Asbestos** (Car)
Johna-Manville, Inc.
- Roofing, Car**
Haskelite Mfg. Co.
Pantastote Co., Inc.
- Roofs, Car and Bus**
Haskelite Mfg. Corp.
- Sanders, Track**
Brill Co., The J. G.
Elec. Service Sup. Co.
Nichols-Lintern Co.
Ohio Brass Co.
- Sash Fixtures, Car**
Brill Co., The J. G.
Edwards Co., Inc., The O. M.
- Sash, Metal Car Window**
Edwards Co., Inc., The O. M.
- Scrapers, Track** (See Clean-
ers and Scrapers, Track)
- Screw Drivers, Rubber**
Insulated
Elec. Service Sup. Co.
- Seats, Bus**
Brill Co., The J. G.
Hale-Kilburn Co.
- Seats, Car** (See also Rattan)
Brill Co., The J. G.
Hale-Kilburn Co.
- Sealing Materials**
Brill Co., J. G.
Haskelite Mfg. Corp.
Pantastote Co., Inc.
- Second Hand Equipment**
Electric Equipment Co.
Gerke, J. W.
Hyman-Michaels
- Shades, Vestibule**
Brill Co., The J. G.
- Shovels**
Brill Co., The J. G.
Hubbard & Co.
- Side Bearings** (See Bearings,
Center and Side)
- Signals, Car Starting**
Consolidated Car Heat. Co.
Elec. Service Sup. Co.
Nat'l Pneumatic Co., Inc.
- Signals, Indicating**
Nichols-Lintern Co.
- Signal Systems, Highway**
Crossing
Nachod Signal Co., Inc.
Wood Co., Chas. N.
- Signal Systems, Block**
Elec. Service Sup. Co.
Nachod Signal Co., Inc.
- Slack Adjusters** (See Brake
Adjusters)
- Sleeve Wheels and Cutters**
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
Nuttall Co., R. D.
- Smokestacks, Car**
Nichols-Lintern Co.
- Snow-Plows, Sweepers and**
Brooms
Brill Co., The J. G.
Consolidated Car Fender Co.
Cummings Car & Coach Co.
Root Spring Scraper Co.
- Sockets & Receptacles**
Johna-Manville, Inc.
- Soldering and Brazing Ap-
paratus** (See Welding
Processes and Apparatus)
Irvington Varnish & Ins.
Co.
- Special Adhesive Papers**
Irvington Varnish & Ins.
Co.
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and Connectors)
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teries, Storage)
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stroyers**
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Ties, Posts, etc.)
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- Trolley Buses**
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Trolley)
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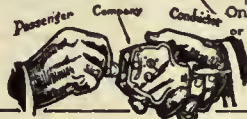
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Meets every condition for all types of cars and buses. The stand device, as shown, adapts it to one-man uses—making register portable or stationary, at option. Handles nickels, dimes, quarters, or metal tickets, in any combination, FLEXIBILITY with CERTAINTY.



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The Evansville & Ohio Valley Railway, in Indiana, placed in service six new modern light-weight cars built by the American Car Company and mounted on Brill low-level 77-E Trucks equipped with Brill Twin Links for the higher speed service. These cars weighed only 17 tons while those displaced varied in weight from 32 to 37 tons.

*Public Patronage can
be attracted by at-
tractive cars, substan-
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ernly equipped.*

In the short space of a few months the economy in power and maintenance and increased riding due to the modern type cars has made the investment a most profitable one.

 **THE J. G. BRILL COMPANY** 
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ST. LOUIS, MO. — CLEVELAND, OHIO — SPRINGFIELD, MASS.



The type of bus ordered for Miami

25 Gas-Electric Buses ordered for Miami, Florida

The Miami Electric Railway is the second company in the South to insist on Electric Drive.

Railways have been quick to appreciate the value of this new form of drive because of its greater possibilities with regard to schedule speeds, operating economies and long life. Besides, electric drive appeals particularly to railway men because of their familiarity with electrical equipment.

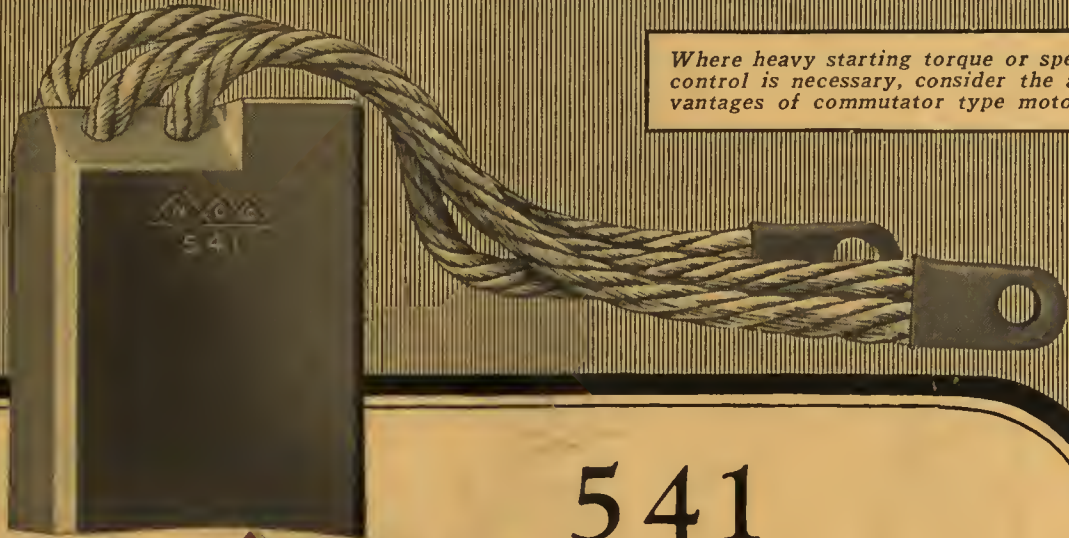
These buses, being G-E equipped, have the advantage of the General Electric Company's long experience in the development of electric bus drive.

11-75

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ELECTRIC RAILWAY JOURNAL



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An Unusual Meeting

ON THURSDAY and Friday of this week the Central Electric Railway Association held its mid-winter meeting at Indianapolis.

Papers by Managing Director Storrs, President Coates, Past-President Budd, Messrs. Wickwire, Gordon, DeLamar, Kenney, Pinkley, Blinn, Graham, Smith, Nicholl, Norris and others were delivered before a large and enthusiastic audience.

A particularly optimistic viewpoint was presented. The program included able discussions on many subjects of vital interest to the industry. The quality of the papers was so high that the JOURNAL will run next week an unusually full report of the meeting.

There is ample evidence that an era of prosperity for the industry is rapidly opening up. Every railway man may receive much inspiration from a careful reading of this report.

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SAVING THE RAIL SAVES THE RAILWAY

Rejuvenation

The "Journal" says that "Rejuvenation" is a word that is being bandied about a good deal in electric railway circles these days.

We are glad to hear it. As applied to track-work, we've preached it for years. And in no other department are results more gratifying.

Neither new rolling stock nor advertising nor better schedules will avail if worn or corrugated rail and battered joints continue to bump the riders and offend everybody by noisy rattles, thumps and squeaks.

Before you order new cars, before you advertise good service, get your track in shape.

Track grinding and joint welding with the modern equipment here shown are the logical first steps toward rejuvenation.

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And prices?*

Railway Trackwork Co.

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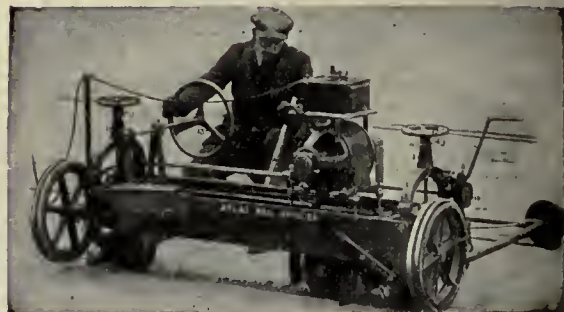
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H. F. McDermott, 208 S. LaSalle St., Chicago
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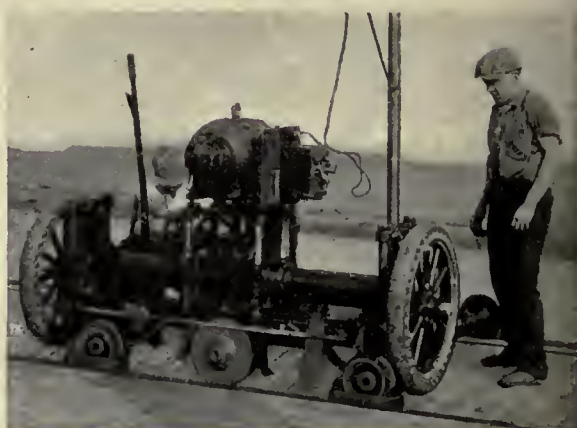
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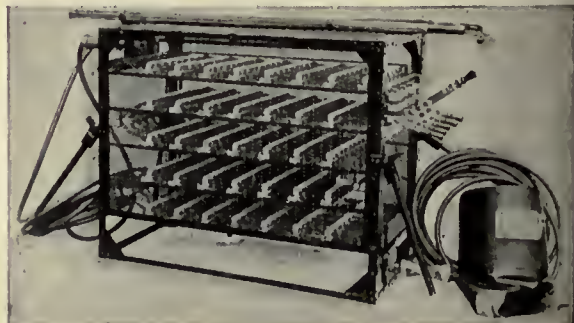
Reelprocoating Track Grinder



"Atlas" Rail Grinder

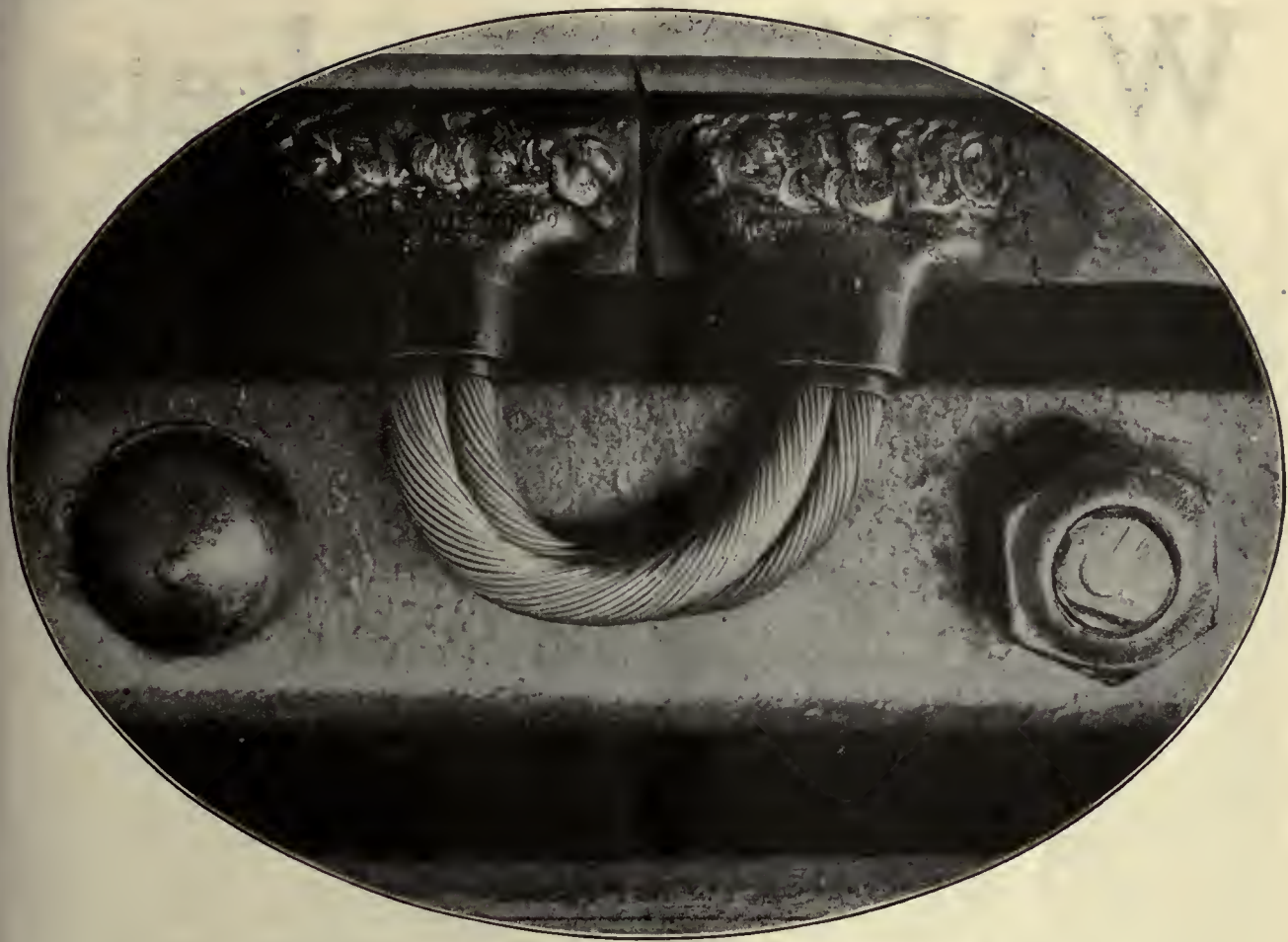


"Imperial" Track Grinder



"Ajax" Electric Arc Welder

SAVING THE RAIL SAVES THE RAILWAY



352 Reasons Every Mile

Using 30-ft. rails, there are 352 joints in every mile of track—352 chances for power loss unless the rails are well bonded—352 reasons for installing

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O-B Bonds have low resistance within themselves and the resistance of the welded terminals is just next to zero. These bonds are so designed that it is easy for the bond man to put them on properly and quickly—easy for him to get 352 permanently good joints in every mile.

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O-B Arc Weld-
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O - B Bonds.
They make it
easy for the
operator to do
good work.



Ohio Brass Co.^{7B}

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are made in the

"HOME OF THE AIR BRAKE"

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They are the result, first, of long experience which has taught us what qualities a gasket should have, and second, the manufacturing methods evolved by careful research and experiment.

These gaskets are made of the familiar WABCO material with beads perfected in design and location, to insure the tightest and most enduring seal at vital points in air-brake apparatus.

Each particular type of gasket is made suitable for its specific purpose by varying the material and its treatment to obtain the right degree of hardness, resiliency, and durability. This is possible because the process is exclusively our own and can be controlled at will.

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Renewable Track—Permanent Foundation



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In some cities there are many large double truck cars, normally needed for mass transportation, on which traffic is so light during periods of the day that they also can then use this operating principle to economic advantage.

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Under View of Bottom Half



Inner View of Top Half

Keystones are both riveted and spot-welded

This combination gives the seams great strength. The rivets hold the sheets together. They provide the tensile strength. The electrical spot-welds unite the sheets of metal in a homogeneous mass at the welds only. They prevent the sheets from slipping one upon the other and so prevent the rivet holes from becoming enlarged. By staggering the rivets and the spot-welds, as shown in the illustration, maximum strength is obtained.

The steel used in Keystone Gear Cases is a soft, open-hearth, deep-drawing steel — tough enough to protect the gear and pinion — body enough to absorb all vibration — and flexible enough to bend and buckle if hit very hard. This flexible feature prevents accidents. For if the case hits an obstruction in the roadbed or if the lower half drops, a Keystone Case merely bends and buckles — and the car rides by. In most instances the case can be easily pounded back into shape. If not, however, it is a simple and inexpensive proposition to replace the lower half.

Keystone Cases are made so that the halves of any given type are interchangeable. This makes replacement easy and insures perfect fits without strain.

Keystone strives for better gear case service. To try us out you can get these cases for 90 days trial. If not entirely satisfactory you have full return privilege.

Every Keystone Steel Gear Case is backed by one year's absolute guarantee.

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Trailer Connectors
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Standard Trolley Harps
Standard Trolley Wheels
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Pantasote
for car seats and curtains
Agasote
for roofing, headlining,
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Wherever electric cars
are operated you'll find
Pantasote and Agasote

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Sacramento
Stockton
San Jose

Fresno
Santa Barbara
Los Angeles
San Diego

*Pantasote Products
would not be so
universally used un-
less Economy pre-
vailed after all!*

*Specify them for your buses
also!*

Car appearance and passenger comfort are becoming increasingly important factors of successful operation. Many of the electric railways operating in these famous Californian cities have gone far in emphasizing just such features of service. And almost invariably when it comes to a selection of handsome seat, curtain and trim materials, which will require a minimum of maintenance and renewal, the choice falls on Pantasote and Agasote.

These cities find that it pays well, in savings and in goodwill, to specify, and always insist upon, only genuine Pantasote Products.

WARNING!
There is
no substitute
for Pantasote





**When
Yellow Coach
*recommends***





**We recommend
the tools we use
in our own
*business***



PICTURE a highway $2\frac{1}{2}$ million miles long.

Picture a great operating fleet of Yellow Coaches traversing this highway, from one end to the other, every month.

And now picture 150,000,000 passengers every year standing along this highway and paying their fares to ride.

This is the actual laboratory *on the street* of the Yellow Truck and Coach Manufacturing Company, except that the



highway does not stretch in an unbroken straight line. In reality the route is harder, made up of short runs, turns and

curves. Imagine the wear and tear on equipment, the strain on brakes, the demands on engines and transmission through constant stopping and starting, the rack on bodies and the necessary safety and comfort for passengers. The picture the servicing of such a transportation system, the detailed studies necessary and the great factory and engineering works where Yellow Coaches are built.

Such an organization has more to offer

YELLOW

an merely buses. Yellow Coaches are means to an end—*low-cost, profitable* ones. They are the tools used in a transportation business to assure—

1. The proper sort of accommodation to the public: comfortable, reliable and safe—

2. With profit to the operating company.

Yellow Coach recommends the tools and systems which have been worked out in this great operating laboratory—*on the street*. And factory production is not started on a single detail of Yellow Coach design until it has had a thorough and adequate operating try-out.

Thus, Yellow Coach recommends the tools we use in our own business. The entire transportation experience of the Yellow Coach organization is behind every transportation survey.

Write for Yellow Coach literature, it contains a fund of valuable information.



COACHES

A personnel picked from transportation centers

LITERALLY, the experience behind Yellow Coach is world-wide. London, famous for its omnibus system, has yielded its share of practical transportation men. New York, with its railways and coaches, has added its quota. Other cities, where complex transportation problems have turned out key men of marked ability, have contributed. All branches of practical transportation are represented—operation, maintenance, engineering and management.

Consider a few of these men.

Vice-President, GEO. A. GREEN, Vice-President, Chicago Motor Coach Company; Vice-President, Yellow Sleeve Valve Engine Works, Inc.; Formerly Vice-President and General Manager, Fifth Avenue Coach Company, New York City; Formerly Deputy Chief Mechanical Engineer, British Tank Corps; Formerly Works Manager and Chief Assistant Engineer of the London General Omnibus Company.

Works Manager, CHAS. O. BALL, Formerly Chief Engineer, American Motorbus Corporation; Formerly Engineer, London General Omnibus Company.

Chief Engineer, C. I. RACKHAM, Formerly Assistant Superintendent, British War Office, Department of Tanks, Design and Experiment; Formerly Engineer in Charge Experimental Department, London General Omnibus Company.

Assistant Chief Engineer, C. I. BOCK, Formerly Engineer, United States Ordnance Department, Washington, D. C.; Formerly Experimental Engineer, Holt Manufacturing Company, Peoria, Illinois.

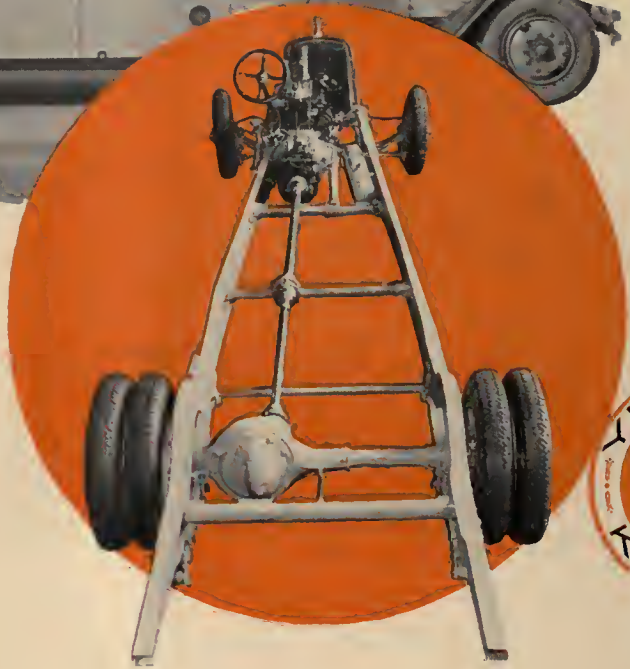


*There is no substitute
for experience —*



Type Y Parlor Coach
25-30 Passenger

Model Y Chassis—
View from rear



Transportation experience expressed in the *off-set power line!*

YELLOW Coach engineers, by studying actual operating performance *on the road*, found that in traversing the right-hand side of the road there is an automatic transfer of load from the left to the right-hand side.

Here was a practical, every-day operating condition to be met with the correct design to compensate this shifting of weight. Moreover, Yellow Coach operating experience demanded a low level chassis free from rear axle pot interference in the aisle

and allowing a spacious loading well at the entrance of the body.

By placing the power line on the left-hand side of the chassis, the engine, transmission control mechanism, drive shafts, propeller shafts and rear axle are off-centered and the shifting of weight is automatically compensated.

This is a feature designed by Yellow Coach engineers and protected by patents. It is the direct result of extensive transportation experience.

YELLOW TRUCK & COACH MANUFACTURING COMPANY
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.



Fort Wayne's 15 New Cars

With the newest and latest door-operating
equipment ————— National Pneumatic

Whenever there's a question of new cars or of remodelling *old* cars,—wherever there's a policy of "please the public," one of the first steps to be taken is the installation of modern door operating equipment,—usually National Pneumatic Door Engines and Control Accessories.

Details on request.

NATIONAL PNEUMATIC COMPANY

Executive Office, 50 Church Street, New York

General Works, Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA, BY

PHILADELPHIA
1010 Colonial Trust Building

Railway & Power Engineering Corp., Ltd.

100

Mack Service Stations

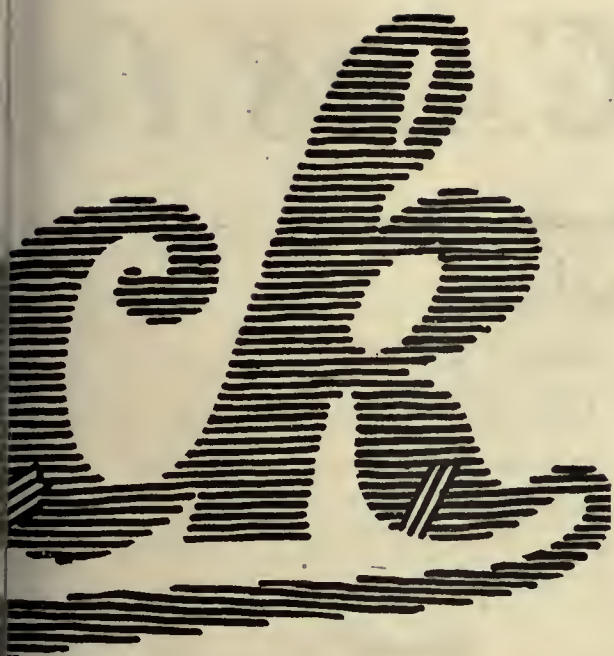
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ALBANY, N. Y.
ALLENTOWN, PA.
ATLANTA, GA.
BALTIMORE, MD.
BILLINGS, MONT.
BIRMINGHAM, ALA.
BOISE, IDAHO
BOSTON (Allston), MASS.
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MINNEAPOLIS, MINN.
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CANADA:
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The first bus was a Mack
-the first Mack was a bus



What's behind
the Bus you buy?

Mack Nation-wide distribution demands Service -and gets it!

Mack buses are in operation in every State in the Union except one. When highway conditions improve and the population requires buses, that State, too, will fall in line.

Such nation-wide distribution demands service -- the kind of service, always available, which Mack is organized to render.

Situated at strategic and convenient points throughout the country, one hundred direct factory branches stand solidly behind the Mack owner with Mack-trained mechanics and several million dollars' worth of stocked parts. Parts and supplies are ready-to-ship at a moment's notice.

The Mack organization stands behind a Mack, *always*, as a matter of business responsibility. Parts are still in stock for the oldest Mack bus, built more than 20 years ago.

Think what this means to you if you value your bus at \$40 a day. Waiting five days for parts means a loss of \$200. With Mack service behind you there is no waiting.

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York City

One Hundred direct MACK factory branches operate under the titles of: "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," "MACK MOTOR TRUCK COMPANY," and "MACK TRUCKS OF CANADA, LTD."



The
Mack
Bus

MODERN CARS for

John A. Beeler said—

“Ways and means must be found to replace the 25,000 obsolete cars in the industry. Lighter, more attractive cars are a profitable investment from every possible angle.”

Extract from paper by John A. Beeler, Consulting Engineer, read at the A.E.R.A. Convention, Atlantic City, N. J., Oct. 8, 1925.

This is the third of a series of advertisements devoted to Modern Cars.

St. Louis Car Company
 INTERURBAN AND CITY PASSENGER CARS AND TRUCKS
 SELF PROPELLED RAILCARS - BUSES
 STEAM RAILROAD COACHES AND FREIGHT CARS
 SEATS, CURTAINS, FRIMINGS AND GENERAL RAILWAY SUPPLIES
 BRIDGE, BRASS, GRAY IRON AND MALLEABLE CASTINGS
 STEEL FORDINGS

Cable Address
 "Car"

St. Louis, Mo., Jan 25/26

TO THE ELECTRIC RAILWAY INDUSTRY:-

Mr Beeler has stated the problem and has pointed the way to its solution. The financing of much-needed modern cars has been usually if not always the stumbling block for the electric railway managements. Now that a number of modernized railways have been operating up-to-date equipment long enough to afford actual data on results, there is no longer any question as to the ability of new cars to pay their way on most electric railways. Added patronage plus lower operating cost is now a certainty - not a speculation. Specific figures show that a modern car may be expected to earn at least 30% return on its cost.

The St. Louis Car Company is prepared to make a study of the equipment conditions on any railway, and to assist in arranging the financing details for suitable new cars to increase traffic and reduce expenses.

Respectfully yours,

Edwin Shearer
 President & General Manager

EBW/D

Modern Conditions—

Springfield and Xenia Railway Co., Springfield, Ohio

recently placed in service light-weight, one-man, two-man, double-end, Interurban cars built at the QUALITY SHOPS of the St. Louis Car Company. These attractive looking cars are 43 ft. 0 in. long over all with passenger and smoking compartments, and a seating capacity of forty-six. The cars are equipped with St. Louis Car Company trucks and seats. Motor equipment—quadruple thirty-five horsepower. Weight complete *eighteen tons*, replacing old equipment which weighed from thirty to thirty-five tons.

Quality Cars



**New Cars Recently Delivered To
SPRINGFIELD AND XENIA RAILWAY CO.
SPRINGFIELD, OHIO**

by

St. Louis Car Company
St. Louis, Mo.

"The Birthplace of the Safety Car"



GAS-ELECTRIC DRIVE MEAS

No more shifting of gears!

From start to full speed
with foot control—faster,
smoother, safer—no shocks
of changing gears and
clutch engagements, no
vibration of over-speeding
engine when you have



Consult the General
Electric Company be-
fore you buy buses to
be sure proper electrical
equipment is applied.

Gas-Electric Drive

(for buses and trucks)

GENERAL

GENERAL ELECTRIC COMPANY, SCHENECTADY, NEW YORK

OVER COST FOR BETTER TRANSPORTATION

NO "shifting into second" on the hills, no working up to "high" after every stop or slow-down, never a stalled or racing engine if you have Gas-Electric Buses.

Gas-Electric Drive relieves the operator of this work and responsibility and gives him full control. His undivided attention is on maneuvering the bus because

the foot pedal automatically governs speed throughout the entire range. Acceleration is more rapid, and it is uniform.

Gas-Electric Drive is an entirely modern, superior and proved method of converting gas-engine power into a steady, propelling force at the wheels.

Maintenance Advantages

*Inspection and testing of engine are simplified, made systematic and conclusive.
Engine cannot be raced or stalled and average engine speed is lower—prolonging life of bearings, pistons, cams and all other moving parts.
Clutch, gears and differential—all subject to high maintenance—are eliminated.
Without the shock of gear changing, the life of engine, chassis and body is longer.
Uniform torque of electric drive means less tire wear.
Engine lubrication is materially less.*

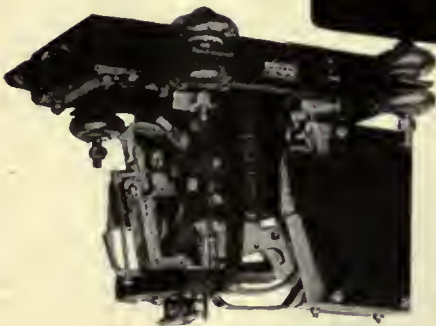
Operating Advantages

*Greater riding comfort—no vibration or jerks during starting, and smooth acceleration.
Increased safety—control entirely in foot pedal relieves operator's hands for steering—skidding is minimized by individual drive on rear wheels—engine cannot stall on dangerous crossings.
Higher schedule speeds—through more rapid acceleration and reduction of driver fatigue—affording lower costs and higher receipts.*



11-18

ELECTRIC
SALES OFFICES IN ALL LARGE CITIES



The cover is readily removable

This G-E Line Breaker is new and better

Reasons why it is better:

The new G-E Line Breaker control handle replaces the usual main operating handle of the controller, as well as ratchet-switch, slip-ring or cam-operated contacts, which previously have been placed inside of the controller. It makes installation of line breaker equipment easier and operation better than ever before.

Lighter weight—in line with the lighter weight of modern car equipment.

The cover is readily removable—permitting access to working parts.

Parts are more accessible—which also facilitates inspection.

Improved blow-out.

Less installation expense—made possible by the new operating handle.

If you are not familiar with the purpose and advantages of Line Breakers, get in touch with our local railway specialist.



GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN ALL PRINCIPAL CITIES

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

MORRIS BUCK, Managing Editor

Volume 67

New York, Saturday, January 30, 1926

Number 5

Valuable Study on Franchises Is Expected

FOLLOWING an extensive tour of Europe, the Illinois legislative committee which is making an investigation of franchises, with particular reference to terminable permits, is now touring this country. Legislative junkets are not unusual, but seldom is a study of this magnitude made. This committee has nearly two years from the date of its formation in which to report. In this interval and with the opportunity to study so many cases first hand unusual means will be available for compiling one of the most complete works on modern franchises.

In some respects the opportunity before this committee is like that of the legislative committee of the State of Massachusetts formed years ago to investigate the relationship between street railways and cities and towns. That committee, after extensive studies here and abroad, published in February, 1898, through its secretary, Charles Francis Adams; what remains to this day one of the most complete works on franchises. In this case the conclusion was that the best form of franchise was a revocable permit. Revocable permits are still common in Massachusetts, although that state has not adopted the more complete type of terminable permit which is especially adapted to state regulation and which was introduced by Wisconsin in 1907.

Today only eight states provide for terminable permits for street railways. And in these eight states there are quite a number of companies operating under term franchises. The American Electric Railway Association in 1924 prepared a report on this subject favorable to this form of franchise. Investment bankers favor the terminable permit. Moreover, the National Municipal League and other civic associations have repeatedly indorsed this form of grant.

Two considerations have militated against the terminable permit. Public utility operators have not acted in concert to support it and the provisions in some of the terminable permit laws have made them undesirable. Provisions that institute a form of city control or that permit cities to levy heavy special taxes against utility corporations tend to make such laws unpopular in a time when the tendency is toward reducing the amount of taxation that must be passed on to the consumer. It has been realized for years, especially since the period of difficulty in financing electric railways which followed the war, that the terminable permit is the modern form of franchise. Error, if error there be in the terminable permit, does not lie in the permit as a form of grant, but rather in the lack of proper application of the principle back of the idea.

The members of the Illinois legislative committee have the benefit of years of regulatory experience and a historical background of 27 years more of public utility control and regulation than did the Massachusetts committee in 1898. They have the opportunity within their

grasp to produce a report that every one interested in public utility regulation will want to study and one that every operating company will want in its library. It can only be hoped that the Illinois terminable permit bill, for no doubt there will be one, will be so inclusive as to mark an epoch in the history of franchise settlement matters.

Governmental Stinginess Again Threatens Efficiency of Patent Office

FUNCTIONING of the United States patent office has been improved recently by increased salaries for examiners, but its efficiency is now being impaired for another reason. Federal judges, under whom exclusively the adjudication and enforcement of patents are performed, are resigning because of inadequate salaries. Men well versed in patent law are leaving the bench and are being replaced by men who will have to become proficient as they decide cases. These federal judges do not have opportunity to add to their incomes by outside work.

United States district judges receive \$7,500 per year, circuit judges \$8,500. Judges of the Supreme Court in the state of New York receive \$17,500; in New Jersey \$18,000; Pennsylvania \$17,500; Illinois \$15,000; Massachusetts \$12,000; Michigan \$10,000. The federal judges have social and professional obligations at least equal to the obligations of state judges, but their salaries do not permit the filling of their obligations, especially in the larger cities.

There are 191 federal judges in the United States and their present combined yearly salaries amount to \$1,535,991.91, about 1½ cents per inhabitant. Bills providing for an increase of about ½ cent per inhabitant have been introduced into Congress. They provide for raising the salaries of the chief justice of the United States to \$20,500; associate justices of the Supreme Court to \$20,000; circuit judges in the second circuit, comprising New York and Vermont, to \$15,000; circuit judges in the four next most populous circuits to \$14,000; and circuit judges in the remaining of the nine circuits to \$13,000.

The bills provide for the district judges \$10,000, with the provision that if the population in a district exceeds 2,000,000 the salaries shall be increased \$500 for each 100,000 population in excess of that sum up to within \$1,000 of the circuit judge's salary. If the differential in favor of the salaries in the more populous districts should not be enacted, then the salaries for the district judges in general should be correspondingly raised.

These proposed increases are in no way extravagant. Certainly it is well for industry to have the federal judges, who handle its patent cases, free from the personal financial worries bound to exist when salaries are inadequate; free to give the careful thought and concentration demanded by their judicial duties.

They Are Talking It Over Again in New York

MAYOR WALKER of New York has at least started right with respect to the traction problem. He appears anxious to do what he can to help and to make good on his pre-election promise to bring some measure of relief. As a first step in that direction he recently had the members of the State Transit Commission and the City Board of Transportation confer on the situation as it now stands. Since then he has conferred with officers of the Interborough Rapid Transit Company.

With the Mayor's own proposal of debt exemption for city bonds to be used to finance new construction there is much chance to find fault on the score that it is unsound economics. At best it would take several years to have his proposal enacted. It is hardly in place here to refer to the suggestion except that it indicates one trend of thinking. As for the Transit Commission, General O'Ryan still thinks that the plan of unification of the transportation lines, first advocated by that body several years ago, is the best move that could be made looking toward an improvement in the situation in the near future. Altogether, there are many suggestions of ways to accomplish a much-needed result. Some of these suggestions are practical, but as indicated before, many are highly impracticable.

There is no need now to attempt to analyze even the most important of the proposals made. The matter has not yet got beyond the discussion of preliminaries. The important point is that the discussion is in tones of helpfulness and not of recrimination. That in itself is distinctly a pleasant change. But pleasant as it is, it is after all action that is needed. The public officials most intimately concerned and the representatives of the railways may hobnob under the most favorable business relations, but unless the former do more than that the public will be no less inclined to find fault with their elected representative than they were when the principal incumbents of City Hall vied with contestants at Madison Square Garden for sporting honors and public officials said it with slang instead of with shovels.

Outworn Arguments Advanced Against Interstate Common Carrier Regulation

LOUD wails of anguish are heard in certain quarters because a bill to regulate interstate commerce by motor vehicles operating as common carriers on public highways has been introduced in the United States Senate. The Truck Users National Conference is distributing a pamphlet in which the proposed legislation is described as "a menace to motor carriers." Threats of "confiscation" and "monopoly" are carried in this bill, says the association. Sponsorship of the bill is attributed to the American Electric Railway Association, the American Railway Association and the National Association of Railroad and Utilities Commissioners, and this seems enough to condemn it in the eyes of the truck users. All the familiar arguments against a regulated monopoly and favoring unrestricted competition are paraded again.

One is reminded of the passage in the Bible telling that "now there arose up a new King over Egypt which knew not Joseph." From time to time there arises a new generation which knows not that our present sys-

tem of utility regulation was arrived at after long and costly experimentation. Worn out and discarded theories concerning the desirability of competition in providing transportation facilities are brought forward as new discoveries.

What would the unlicensed interstate common carriers say if the electric and steam rail lines, now so closely regulated, should participate in a general free-for-all scramble for traffic by cutting rates? Would the unregulated carriers like that? Probably not. For others they believe in careful supervision that compels the provision of regular and adequate service at reasonable rates. For themselves they want the privilege of coming and going as they please, and particularly of charging whatever rates they please.

But public memory is short. Many people have forgotten and others perhaps never knew that this question was first raised many years ago, and that experience has shown in countless cases that the public benefits most when transportation is a regulated monopoly. So long as these outworn arguments are advanced against regulation the railway companies must remain alert and aggressive in answering them and demonstrating their fallacy.

Customer Satisfaction a Goal for the Railway Operator

OCCASIONALLY there is cause for condemnation as to why some men fail and why others make good in business. Men are heard of who are especially successful in real estate, in baseball, in music and in many other fields. Why should not a little of their acumen be applied to the hard-working business of local transportation? A recent example is one "Red" Grange, who broke from the sporting sheet into the front pages of the newspapers so frequently a few months ago that many began to wonder what all the fuss was about. Attendance at professional football games jumped from twenty and thirty thousand to fifty and seventy thousand. The sport writers say the answer is that "the customers leave satisfied." They came for thrills, runs and surprises; saw what they wanted, left satisfied, and told the world about it.

How can a railway develop enough interest to double its business? Maybe it can't, but it can help things along quite a little by "satisfying the customer." Too many of our railways are doing things not because the public wants them, but because they are following tradition and give the public no choice in the matter. If they think longitudinal seats will enable them to crowd more passengers into a car they turn a deaf ear to a public that wants to face forward when it rides.

The companies that have consulted with the public about their cars, their seating arrangement, and similar matters, have done much in this regard. Even little trick devices that do not save money but give a little element of surprise help a great deal. The rush-hour crowd says to the folks at home, "Have you seen the new bulletin boards on the cars," or "How do you like the cushions on those new seats," and in other ways takes an interest in the car ride instead of regarding it as a part of the daily drudgery of going to and from work.

Sad tales of paving burdens, high taxes and other inequalities to which they are subjected will do the railways no good unless they "satisfy the customers."

"Co-ordination"—Theme of New York Railway Association Meeting

PART of the work of furnishing co-ordinated transportation is the molding of a co-ordinated viewpoint. That this latter has been about accomplished was evident to members of the New York Electric Railway Association who were privileged to hear the addresses of E. F. Wickwire and John A. Ritchie at the mid-winter dinner of that association in New York on Jan. 27.

The bus arrived in the field when the electric railway industry was at a low ebb and succeeded in living "off it" for some time. Mr. Wickwire said the industry was better now and was not going to stand that treatment any longer, but was making adequate plans for having the bus live "with it," assuming its own duty and accepting its own responsibility.

Mr. Ritchie, on the other hand, having lived through early bus days, recognizes the street car as typifying an industry with experience and financial backing. He recognizes the futility of strife and the desirability of co-ordination. He expounded the theory that *ELECTRIC RAILWAY JOURNAL* has often expressed that a co-ordinated operation carries with it the responsibilities of a co-ordinated investment. If rail lines are to be abandoned the successor vehicle must be allowed to earn a sufficient amount to retire the original investment. Otherwise what attraction will there be in transportation investments if the old money must be lost every time the wind changes and a new type of vehicle or method comes into the field?

Many other expressions of these two men, typifying, as they do, the railway viewpoint on the one hand and the bus on the other, show the progress that has been made in welding these two great ideas into one of greater service in the field of transportation.

Internal Co-operation the Main Objective in Modern Corporations

THE greatest objective in modern industrial personnel work is to secure the maximum amount of co-operation between all departments and between all the individuals in each department. Years ago, when corporations were small, very little effort was necessary to bring about this co-operation. Most of those engaged in the same shop knew each other and took an interest in what their fellow workers were doing. As corporations grew in size, the interest of the average worker in the success of the company as a whole naturally became less. His weekly pay envelope, rather than the financial interests of his employers, was the most conspicuous object on his mental horizon.

Within recent years effort has been made by most large companies to correct this situation as far as possible, and a number of electric railway companies have led in this movement. The task is not an easy one, because as a company grows in size, it becomes increasingly more difficult to diffuse through all of the departments an interest in the work and knowledge of the policies of the company. It is fortunate, therefore, that a paper on ways of securing internal co-operation was presented at the meeting this week of the New York Electric Railway Association, by an official in a company which has been conspicuous for its success in this direction.

Dr. Segard has no wonder cure for bringing about the result sought. His remedy is the simple one of educa-

tion on the aims of the company, coupled with encouraging a willingness on the part of each worker to give to his fellows and receive from them all the helpful assistance possible. This means also, of course, a readiness to receive these suggestions and other assistance in the right spirit, because, with most people, so far as suggestions are concerned, it is far more blessed to give than to receive. Nevertheless, the man who is unwilling to accept suggestions, associate with others in business on a friendly basis and help them with his own experience has largely outlived his usefulness.

Methods of Training Future Executives Deserve Careful Consideration

SYSTEMATIC training for young men for executive positions in the electric railway industry was advocated in a paper by R. E. Danforth presented at the midwinter meeting of the New York Electric Railway Association. Ordinarily, suitable material for future executives is to be found in any organization of considerable size. How best to insure its development is the problem. That the solution should be left to chance is unthinkable. In the opinion of Mr. Danforth, schools for trainmen, lectures, etc., do not go far enough. A definite program is needed for the selection of promising candidates for advancement and their subsequent training.

It must be admitted that many of the present executives of the electric railway industry have risen from the ranks by their own perseverance and effort without any special course of training. Why, then, bother to train young men for executive positions? Times have changed and the industry itself has changed. It has grown in size and complexity. Competition unknown 20 years ago has reached a serious stage today. Methods of training and advancing employees should be modernized just as much as the physical plant.

Experience alone does not today fully equip the individual for an executive position, nor does an education, whether technical, legal, scientific or classical. Other qualities are needed today, including the ability to express one's ideas clearly and to get them across successfully to others. Familiarity with the practices and work of all departments of the railway is valuable to those suitable for advancement. Opportunity to gain such knowledge should be given to the more able and progressive men of the organization.

Young men should be selected for this purpose when first employed, according to Mr. Danforth's theory, or soon thereafter. High school graduates should be shifted from department to department systematically for a year or two, to give them a working knowledge of the methods and problems of each. These young men may then be placed in the ranks of any department and permitted to grow up there until age, experience and evident ability show them ready for promotion. For others who have had college educations, he advocates a cadet engineer's course, after the completion of which they may be placed in minor supervisory positions, used as executive clerks to the general manager, or placed on the engineering staff. As one of the pioneers in the field of systematic training of young men in the electric railway industry, Mr. Danforth speaks with knowledge and experience, and his opinions deserve the careful consideration of the present executives.



One of the New Cars. Steps Are Unnecessary Because High Level Platforms Are Used at All Stations

New Cars for the Chicago Elevated

Several Features Are Included to Give Greater Convenience and Comfort,
Although the New Equipment Is Practically a Duplicate
of that Already in Service

By Colin K. Lee

General Engineer Westinghouse Electric & Manufacturing Company

ONE HUNDRED new steel cars have been ordered by the Chicago Rapid Transit Company recently to increase the service on its elevated lines. The electrical equipment is virtually a duplicate of that ordered in 1922, and that in turn was practically a duplicate of the 1914 order. An accompanying table gives the principal dimensions of the new cars. Particular attention has, however, been given toward providing a car of pleasing appearance both inside and out.

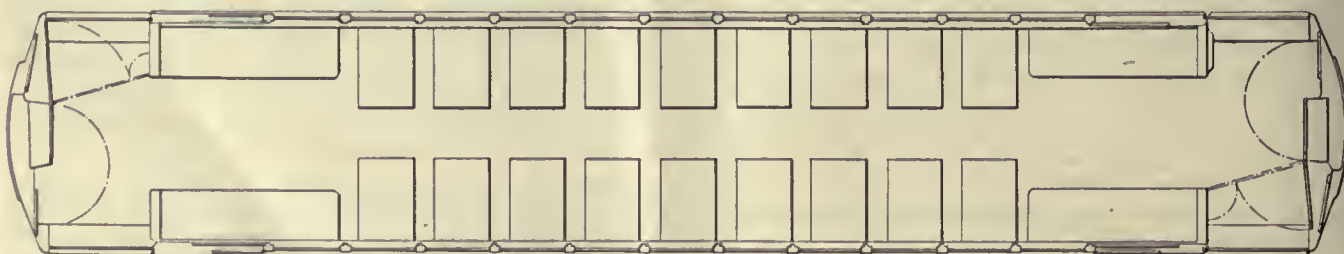
Seats are provided for 52 passengers. Thirty-six can be accommodated on the cross-seats. Four longitudinal seats, one at each corner of the car, provide for the remaining sixteen passengers. The seats are soft and plush covered. They are a trifle wider than those usually found in city service, being 37 in. wide. The seat spacing is 32½ in., which also provides somewhat more knee room than is usually found. The increased width of the seat has narrowed the aisle somewhat, so that this is but 21½ in.

Hand straps of a white enamel rigid type are used only at the ends of the car over the longitudinal seats, which are 6 ft. long. Looking through the car from one end, the passenger is impressed particularly with

the unobstructed view. There are no vertical stanchions in the line of vision, which usually give a crowded appearance, regardless of their desirability for convenience of standees. The clear vision of the passengers is also extended to the side windows, which are arranged particularly to give an unobstructed view outside with no guard railings. Plate glass gives a rich effect and there is no danger of outside objects presenting a wavy appearance.

Arch-type roofs are used and the line where the roof joins the end partition has a simple graceful curve. Lights are arranged in three rows, one down the center of the car and one row on each side. The lighting fixtures are attractive. Deep translucent shades shield the lamps so that direct rays do not annoy the passengers. Efficient lighting is obtained through the use of the white enameled arch ceiling. The interior finish, aside from ceiling and floor, is mahogany. Twelve ventilators are arranged in the roof. In addition, two 12-in. electric fans are provided, one at each end of the car. These fans are driven from a storage battery.

Particular attention has been given to make the car warm and soundproof. Thick salamander insulation



Floor Plan and Seating Arrangement of the New Cars



Seats Are Wide and Plush-Covered. Lighting Is Good and Passengers Are Afforded an Unobstructed Vision



Short Longitudinal Seats at the Doorways Help to Prevent Congestion by Providing a Wide Aisle at Ends

is used, with double wood floors on top of the steel plates. Exposed sheets, such as sides and letterboards, are of Armco iron. Other details of reconstruction include 12.25-lb. I-beam center sills, 6-in. channel side sills, $\frac{3}{8}$ -in. pressed cross-sills, $\frac{1}{8}$ -in. continuous floor plate, $\frac{1}{2}$ -in. steel headlining and pressed steel side posts and doors.

The motive equipment consists of two Westinghouse No. 567-R-1 motors, both mounted on one truck. These motors are a standard Westinghouse type, slightly modified to meet local conditions. Covers and axle caps are chained to the frame as a loose piece is particularly undesirable in elevated car operation. Other important

features of this ventilated motor include through axle cap bolts, bolted commutator, dust guards, axle shields, tapped field, pressed steel gear case, etc. Strap windings are used without sharp crossovers. The control is type ABLFM, which includes automatic acceleration, energy control supplied either from battery or direct from the line and field control for the motors. It is arranged for operation in conjunction with existing elevated equipment, which includes General Electric type M.

The motorman's compartment occupies the front right-hand side of the platform at each end of the car. This is inclosed by a door which stands lengthwise



At Left—Motorman's Compartment Is Located at the Front Right-Hand Side of the Car. When Not in Use It Is Made a Part of the Vestibule by Closing the Door to Conceal the Operating Equipment. At Right—The Switch Panel Is a Completely Inclosed Unit on the Platform

Principal Dimensions and Equipment of Chicago Rapid Transit Cars

Number ordered	100	End door opening	22½ in.	Couplers	Sterns & Ward automatic—
Builder	Cincinnati Car Co.	Truck centers	33 ft. 8 in.		Van Dorn automatic
Seating capacity	52	Wheelbase motor truck	6 ft. 6 in.	Door-operating mechanism	National
Length over all	43 ft. 0 in.	Wheelbase trailer truck	5 ft. 6 in.		Pneumatic
Length over body	37 ft. 10 in.	Diameter wheels motor truck	34 in.	Heaters	Consolidated Car Heating Co.
Length of platform	5 ft. 1 in.	Diameter wheels trailer truck	31 in.	Motors	Two Westinghouse 567-R-1, 170 hp.
Extreme width over eaves	8 ft. 10½ in.	Height rail to center of drawbar	29½ in.		at 600 volts
Width over side sheathing	8 ft. 6½ in.	Post centers	2 ft. 7½ in.	Seating material	Plush
Rail to bottom of side sill	3 ft. 2 in.	Weight complete	76,400 lb.	Trucks	Baldwin Class 66-30-AT, Special
Rail to top of roof	12 ft. 3½ in.	Body	Steel		and Baldwin Class 78-30-A, Special
Width cross-seats	37 in.	Interior trim	Mahogany	Ventilators	Railway Utility Co.
Width of aisle	21½ in.	Roof	Arch	Wheels	Driving truck, 34 in.; trailer
Length of longitudinal seats	6 ft. 0 in.	Air brakes	Westinghouse type AMU.		truck, 31 in.
Sliding side door opening	3 ft. 8 in.	Control	Westinghouse ABLFM		

of the car when occupied by the motorman. When not in use the door swings forward and incloses the motorman's control devices. The control equipment must thus be capable of installation in a comparatively narrow space. The master controller is type XM-110. It is provided with three drums, placed one above the other, with three concentric operating shafts. The reverse handle is arranged so that it cannot be left when the motorman leaves his post.

A new feature is the arrangement of the switchboard equipment. A full length steel cabinet is built into the platform face of the bulkhead at the left side of the platform. This contains the panel bearing, three heater switches, switches for lights and air compressor and the large knife switches for trolley and third rail, heat and light bus, main motors, air-door-switch cut-outs, together with the necessary fuses. Each item is marked plainly, and in spite of the large number of devices the space occupied is surprisingly small.

Fellowships Offered in Transportation

FIVE Strathcona Memorial Fellowships in Transportation, of \$1,000 each, are now being offered annually for advanced work in transportation at the graduate school of Yale University. Special attention will be paid to the construction, equipment and operation of railroads and other engineering problems connected with the efficient transportation of passengers and freight, as well as the financial and legislative questions involved. Transportation by water, highways or airways and the appropriate apparatus involved, and also other general aspects of the broad field of transportation, embracing its legal and economic phases, will be included in the list of subjects which the fellows may select for investigation and study. The holder of a fellowship must be a man who has obtained his first degree from an institution of high standing. In making the award, preference is given, in accordance with the will of Lord Strathcona, to such persons or to the sons of such persons as have been, for at least two years, connected in some manner with the railways of the Northwest.

Applications for these fellowships should be addressed to the dean of the graduate school of Yale University, New Haven, Conn., before April 1, on blanks which may be obtained from him. Applicants must submit with their application a brief biography and a certified record of their previous courses of study in college or technical school and their standing therein. They should also submit testimonials bearing upon their qualifications. A recent photograph of the applicant is requested.

Various courses of study relating to transportation along engineering, economic and legal lines are now offered by Yale University. Upon completion of the pending survey of various fields of transportation and

the character of instruction and investigation therein there may be anticipated some rearrangement of certain of the courses above cited and some amplification thereof. Pending such adjustment, the Strathcona Memorial fellows will be entitled to pursue investigation in those aspects of transportation in which the university now offers competent guidance and supervision.

Reducing Gear Noise

Tests on a Large Variety of Motor Gears Show that the High-Pitched, Bell-Like Tone Which Is Most Penetrating and Annoying Can Be Reduced by Bolt-ing on Pads of a Rubber-Asphalt Material

By E. S. SAWTELLE

Assistant General Manager Tool Steel Gear & Pinion Company, Cincinnati, Ohio

NOISES of two distinct types emanate from electric railway car gearing. The first is a low tone vibration or rumbling, which comes primarily when the gears and pinions are not meshed properly for perfect involute action. The second is a high-pitched, bell-like tone which is found to have great penetrating and carrying power. Concerted efforts are now being put forth by electric railway operators and manufacturers of railway equipment to reduce all types of noise which come from car operation. For some months the writer has been carrying on tests in an effort to find a solution for the problem of reducing the noises which come from ringing gears and which are particularly objectionable to car riders.

The low tone vibration or rumbling which comes from car gearing is due either to worn gearing or to worn or poorly maintained bearings, which permit spreading of the gear and pinion centers. In the extended observations which I have made I have found it extremely unusual for new gears and pinions to produce undue noise. The most obvious solution for reducing the rumbling type of noise is to correct bearing troubles, maintain closer gear and pinion centers and where the gearing is excessively worn to replace it. On many properties gears are left in service too long for quiet operation, as these properties consider the replacement of gears too expensive, and so they are left in operation, despite the increased noise.

The introduction of helical gears was based primarily on noise elimination. Reports of the equipment committee of the American Electric Railway Association for several years past indicate that this type of gearing has reduced gearing noises. This type of gearing, however, like the spur type, cannot be expected to be in the best operating condition if bearings are permitted to become badly worn or if the gear and pinion are excessively worn or in poor alignment. Observations of helical gears in service show that where

excessive noise is found this is due mainly to their being in a worn condition.

The low-toned rumble of gearing is akin to the general industrial noises which prevail in most of our cities and is not considered as decidedly objectionable. In reducing noises, however, any steps which will curtail or eliminate the low-toned noises are in the right direction. Certainly a higher grade of maintenance which will give more attention to bearings and to worn conditions will result in other benefits to the car equipment as well as materially reduce the low-toned noises.

The high-pitched, bell-like tones which have great penetrating and carrying power are the second class of noises frequently found in gearing. These are extremely annoying and frequently can be heard for a square or more as the car approaches. This class of noise has been found to come almost exclusively from forged gearing, which has a bell shape, and it is seldom encountered in the spoke type of gear made from a steel casting. The latter, however, has become practically obsolete for railway cars.

I have made a large variety of tests in an effort to reduce the shrill ringing noise. These efforts have been confined principally to bolting blocks of wood or

similar material to the gear or to packing some quieting material, such as cork or sawdust, against the gear. The use of such material has proved only partly successful. A few months ago I became interested in a rubber-asphalt material marketed by the Philip Carey Company for track installation. This was tried on gears in an



Pads of Rubber-Asphalt Material Bolted to Web of Gear Have Been Found Effective for Reducing Gear Noise

effort to reduce the ringing sound. The first test was conducted on a test machine and in my own shop, with gears mated in such a manner as to generate the ringing noise. When pads of the rubber-asphalt material were bolted onto the webs of the gears the ring was almost completely eliminated. Observations, however, showed that the low-toned rumbling sound previously referred to was not particularly affected by the addition of the pads. After these preliminary tests, a particularly noisy crane installation was observed with its gearing operated in an exposed position. Noise from this crane could be heard for a distance of about two squares on a clear day. Elastite pads were attached and the noise was so reduced that it was noticeable only when standing directly beneath the crane.

In order to extend the tests to gearing in actual electric railway service pads of the Elastite were sent to a large number of railway companies that are making experiments in deadening car noise. Satisfactory results were reported in practically all cases. These tests are now being extended so as to include a large number of companies. I expect eventually to have some very interesting reports. Thus far the tests have

been confined to cars which have been picked out for noisy gearing. When they have been brought into the shop for installation of the silencing material it has been found invariably that the gears were somewhat worn and that the noise primarily was a result of the wear. Application of the sound-damping pad shows that gears, even in their worn condition, can be operated without much objectionable noise. If the use of such pads will enable gearings to be continued in service for a longer time, this practice is certainly commendable. The pads are comparatively inexpensive and can be attached readily to any railway gear by bolting through the web holes.

An accompanying illustration shows a typical installation. Two pads appear sufficient to kill the most objectionable noises. They are bolted in the deep side of the web, care being taken to have the pad made so that it presses tightly against the rim and against the hub. Ordinary machine bolts are used with an arrangement so as to lock the nut on the pad side and with a fixed rectangular metal washer spot-welded to the head of the bolt on the back, in order to keep it from turning and from pulling through the web hole. In most cases these pads can be attached by merely dropping the gear case.

From the tests so far conducted it appears that only exceptional gears have sufficient ringing noise to need silencing pads when in proper condition. It would thus seem undesirable to put the pads on all gearings, but rather to carry a small supply in stock for use whenever a car is found in which the gears are exceptionally noisy and still not worn sufficiently to warrant replacing. The Tool Steel Gear & Pinion Company, which has been conducting tests, is not financially interested in the sale of the pads, but through the co-operation of the Philip Carey Company has been obtaining them without charge for railways interested in testing out their use. Inasmuch as the pads must be made to fit the contour of the web of the particular gear on which they are to be attached our engineering department has been working up drawings for such installations and is helping in every way possible to get the tests started.

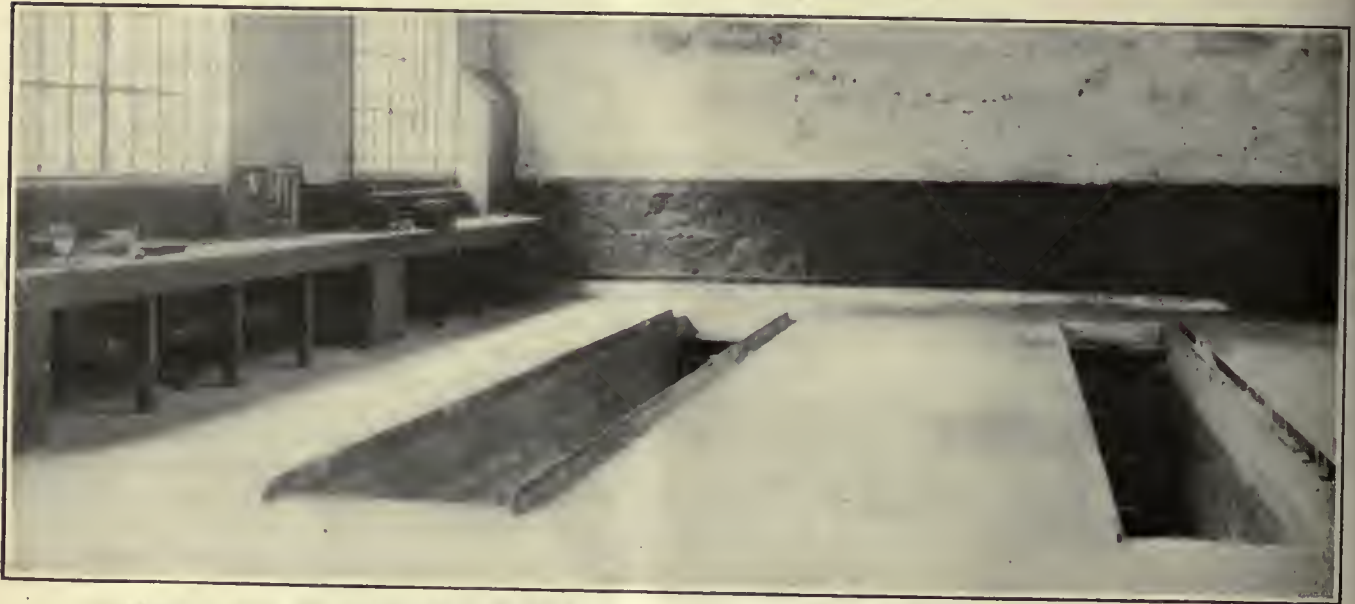
Electric Locomotive Demonstrates High Overload Capacity

TO DEMONSTRATE the temporary high overload capacity of an electric locomotive as against a steam locomotive, the Chicago, Milwaukee & St. Paul Railway recently conducted some tests at Hyak, Wash., on the Cascade division of the Milwaukee's electrified line. For the purposes of the test, an ordinary bi-polar electric locomotive, having a maximum tractive effort of 137,000 lb., such as is used on passenger service on this division, was coupled to a type "C" steam locomotive, having eight driving wheels, and weighing with tender about 150 tons, and a Mallet compound, having twelve driving wheels and weighing about 278 tons.

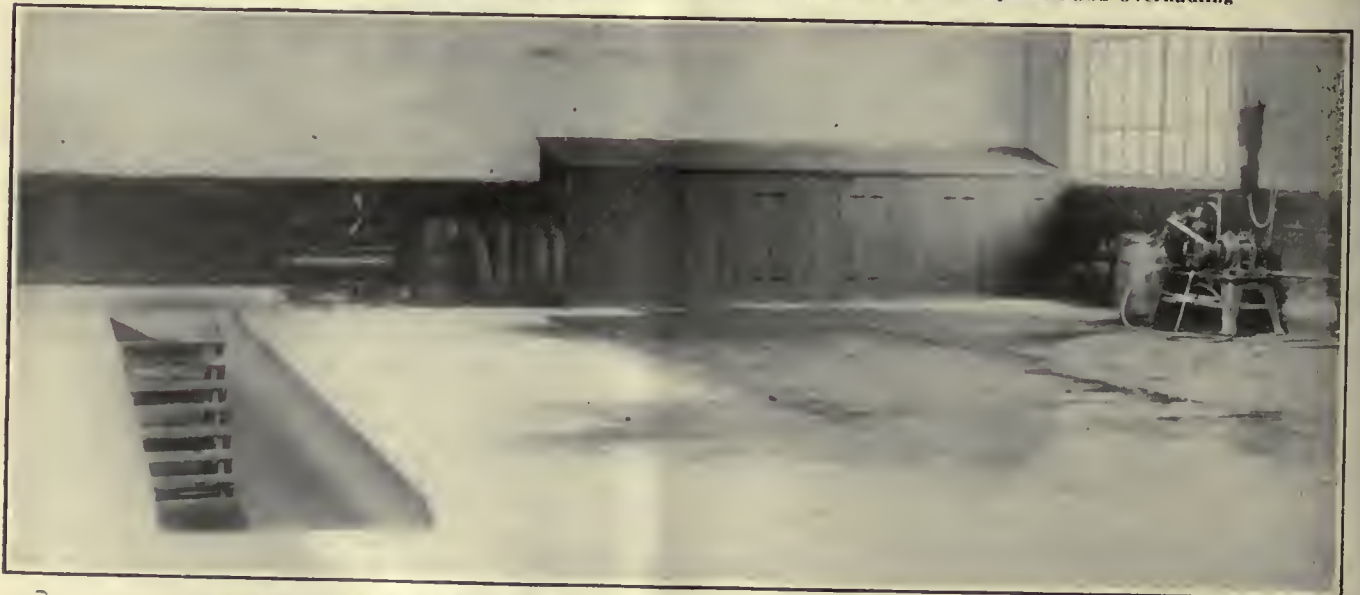
In this test it was found that for short periods of time the electric locomotive pulled the steam locomotives backward against a full head of steam in both, without a rise in temperature in the motor windings sufficient to be damaging. This test was put on to indicate the extreme flexibility in operation of the electric locomotive compared to steam power, which is limited in pulling capacity to the pressure available in the boiler.



Substitution of Steel Beams for Wood Posts Has Permitted the Dubuque Electric Company to Transform an Old Carhouse Into a Roomy Garage



Railway Car Inspection Pits Have Been Retained for Use in Connection with Bus Inspection and Overhauling



An Electrically Operated Spray Washer and a Portable Air Compressor Form Parts of the Equipment of the Bus Garage of the Dubuque Electric Company

Carhouse Remodeled as Garage

By Replacing Old Wood Roof Supports with Steel Beams and Installing a Concrete Floor the Dubuque Electric Company Has Secured a Roomy Structure for Bus Storage—Railway Car Inspection Pits Have Been Retained and New Equipment Added

By A. H. Smith

Railway Superintendent Dubuque Electric Company, Dubuque, Iowa



Entrance to the Garage Is Through an Adjoining Vacant Lot Which Has Been Graded and Paved with Concrete

WITH the inauguration of local bus operation in Dubuque on July 19, 1925, necessitating the purchase of four 25-passenger Mack buses, additional garage space was needed by the Dubuque Electric Company. Bus service was not a new thing to this company, however, as it has been operating buses between Dubuque and East Dubuque for the past eleven years. East Dubuque service was started originally with three electric buses. Owing to battery depreciation these buses were replaced by a fleet of Fords. Later this equipment was replaced by three Dodge-Grahams, which have been in service for the past two years. With only three buses and ten trucks to be cared for, garage space was ample. When bus service became necessary in the outlying sections of Dubuque not served by street cars and the additional buses were bought increased garage facilities were needed.

Instead of erecting a new building a section of the car storage house was remodeled for garage purposes. Dimensions of this building were 55 ft. x 250 ft. The original construction of the building consisted of brick walls with the roof supported by wood beams and posts between the tracks. The rear section was separated by a 12-in. brick partition. This space, 55 ft. x 141 ft., has been arranged as the garage. Aisle sprinklers, trolley wire and tracks were removed. Fourteen 10x10-in. upright timbers were replaced by seven steel girders. The old roof was replaced by asbestos roofing and a semi-collapsible door was installed on the south side of the building.

Adjoining this opening is a vacant lot, formerly used

to store track materials. This was graded and paved with concrete. A rip-rap retaining wall was built at the end of the driveway on account of an incline rising at that point. A concrete curb was needed in another place to hold up an old wall on adjoining private property.

Near the entrance to the garage a 1,000-gal. gasoline tank with a Bowser pump of 5-gal. capacity was installed. Buses are filled with gas before entering the garage at night and immediately after entering are washed, serviced and stored along the wall. Four lighting standards constructed of pipe and containing 200-watt lamps spaced 30 ft. apart illuminate the driveway at night.

The interior is open for its entire length. Twenty buses can be accommodated in this section of the building. It has a concrete floor with two inspection pits, a work bench and a wash rack situated at the rear of the building. The old railway inspection pits have been retained and equipped with guards to keep the bus wheels from running over the edges. Nine windows with steel sash, seven on the south side and two on the north side, furnish ample daylight. Inasmuch as the garage is used principally at night, artificial illumination has been provided by means of sixteen 100-watt shaded lamps, vertically suspended from the ceiling.

Other equipment of the garage consists of an electrically operated spray washer, a portable air compressor for inflating tires and an Alemite grease gun. Ample electrical connections, both 110-volt and 220-volt, are provided for portable extension cords.

Rapid Overhauling Permits Maximum Holiday Service

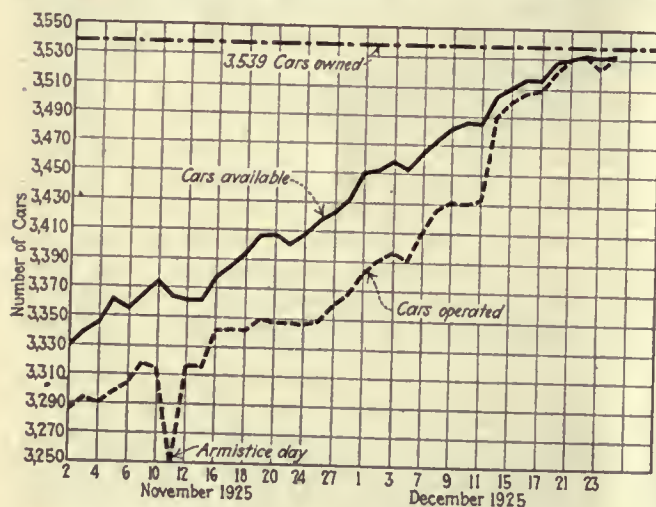
On Two Days Last December the Chicago Surface Lines Operated 99.8 per Cent of All Passenger Cars Owned

BY H. H. ADAMS

Superintendent Shop and Equipment, Chicago Surface Lines

FORESEEING a heavy Christmas business, the executive officers of the Chicago Surface Lines toward the end of last summer started to make preparations to meet this condition by preparing the schedules required, providing extra men and getting the equipment in condition to meet the requirements. It was the duty of the shops and equipment department to supply the maximum number of cars for this service, and it was decided to stop all overhauling of cars at the two shops and to concentrate all available work on cars sent to the shops for damages.

Results obtained in the matter of service, in cars available and cars operated from Nov. 1 to and including Dec. 24, 1925, are shown in an accompanying chart. This shows that the margin between the number of cars available and the number of cars operated diminished gradually, until on Dec. 21, 22 and 24 the transportation department actually operated all the cars that the shops and equipment department had available. On Dec. 22 and 24 there were available and operated 99.8 per cent of the total passenger equipment owned. In other words, out of a total of 3,539 cars owned, there were available and operated on these two days 3,532 cars. From Dec. 14 to and including Dec. 24 there was available for operation more than 99 per cent of the passenger car equipment. This it is believed is a record which has



Ratio of Cars in Service to Total Cars Available on Chicago Surface Lines—Saturdays, Sundays and Thanksgiving Day Omitted

never been equaled in history for a property the size of the Chicago Surface Lines.

The curve does not include Saturdays, Sundays or Thanksgiving Day, as these days, of course, required a smaller number of cars for operation. It does show, however, a low point for Armistice Day, when the demand for extra cars was considerably less. The figures shown in this curve are taken in the afternoon rush maximum requirement period.

In order to have available for the maximum period

the greatest possible number of cars, the work on overhauling cars began to slow down after Nov. 1 and no cars were taken into the shops for overhauling after that date. There were in the two shops on this date 90 cars undergoing overhauling, and in addition, there were 78 cars in for damage repairs, or a total of 168 cars in the two shops. This total was reduced to a minimum for one day of four cars. This was on Dec. 22, when there were in the South Shops three cars and in the West Shops one car. One of the cars in the South Shops was a car that had been badly damaged by fire and the two others were heavy damages that could not be completed. This was the case also with the one car in the West Shops.

At the carhouses during the month of October an average of approximately 36 cars were held in daily for repairs during the rush hours. This covers a total of sixteen carhouses, or approximately $2\frac{1}{2}$ cars per carhouse per day. In order to make as many of these cars as possible available for the maximum period, and after the work at the shops had begun to reduce, men from the shops were transferred to the different carhouses to assist in making repairs to the cars. This was particularly true in connection with the work on body repairs, with the result that many cases of cars having damage done to the body, were taken care of by this force so promptly that the cars were not out of service during the rush hours. There were cases where the front of the vestibule was demolished and the car was repaired and put into service the same day for the rush hours. Painting was taken care of by having vestibule posts and parts painted and kept in stock ready for installation when required.

During the week ended Dec. 19 and the four days immediately preceding Christmas, not including Saturday, Dec. 19, there was an average of only two cars per day held in for repairs during the rush hours at the sixteen carhouses. On Dec. 18 there were no cars held in at any of the carhouses during the rush period, showing the effective work that was done.

An increase of somewhat more than 40 per cent in cars overhauled will have been accomplished by the end of the fiscal year, Jan. 31, 1926, as compared with the previous year. This has been brought about by a change in policy in the matter of overhauling. Previous to Feb. 1, 1925, cars had been brought into the shop for general overhauling on a regular schedule, which averaged about $3\frac{1}{2}$ years between overhauls. After Feb. 1, 1925, cars were brought into the shop that had been out for the full length of their period, and these cars were given the general overhauling. In addition, cars that had been out for a period of two years were brought into the shop and given an overhauling. This last overhauling was much lighter than the general overhauling given to the other cars, due to the fact that less work was required on the cars. In addition to the fact that an increase of more than 40 per cent of the cars will have been put through this year, the average cost per car has been reduced about 45 per cent over last year's cost.

This more frequent shopping of the cars has resulted in a reduction in maintenance, and the electrical equipment has also been given additional tests and inspections, which have resulted in a marked decrease in the number of failures and an improved efficiency, all of which has resulted in the higher standard which enabled the equipment to meet the supreme test at the time of maximum demand.

Ferry Car Solves High Water Troubles

Long Island Electric Railway Has Equipped a Special Motor Car and Trailer to Operate a Shuttle Service Through Flooded Section



Flooded Car Tracks Prevent Usual Electric Operation

ELECTRIC car service is kept on a regular five-minute schedule with water nearly 4 ft. above the rail with a special ferry motor car and trailer, constructed by T. V. Campbell, equipment engineer for Fisk & Roberts, in the Woodside shops of the New York & Queens County Railway. The section of track which becomes flooded after severe storms extends for some 500 to 600 ft. along Jamaica Avenue between 184th and 186th Streets, in Hollis, L. I. Ten to fifteen floods occur annually. During a recent storm the water was 42 in. above the running rail and flood conditions lasted over a period of five hours, in which the usual type of electric cars could not be operated.

This section has no sewers, and the three divisions of the railway which use the two tracks over this section have a five-minute headway. Before the special equipment was constructed it was the practice to operate cars up to the flooded section, where the passengers got off and walked to the next street north of the section and so around the flooded district. The water was so high that buses and automobiles could not operate through it and the inconvenience to the traveling public was quite pronounced. Receipts on these lines fell off from \$100 to \$125 per day as the result of decreased traveling. The flooded section was so situated that water would come from all directions, as there was not only a dip in the street itself, but the adjacent property on all sides was considerably higher than the tracks. The pavement outside the tracks is asphalt and granite blocks are used in the track area. The nearest crossovers to the flooded section over which cars can be changed from one track to the other is five blocks to the west and 26 blocks to the east. It is thus necessary to operate over a single track for a considerable distance when the street is flooded.

In order to provide transportation through the

flooded district, the electric railway constructed a special motor car and used this in connection with a trailer to operate a shuttle service through the flooded section. The motor car has two motors mounted above the floor level and arranged to drive the wheels of the car through link-chain connections. The car used for this reconstruction was an old Taunton single-truck sprinkler car. This had 33-in. wheels and 6-ft. 6-in. wheelbase. The tank was removed and two G.E.-58 35-hp. motors were installed above the floor level. The gears which originally were on the axles of the car were installed on a countershaft and two sprocket wheels obtained from old sweeper equipment were also installed on these countershafts and on the truck axles so as to provide a link-chain drive between the countershaft and the axle.

Accompanying illustrations show the construction used. The countershafts are supported by pedestals at either end; bronze bushings serve as bearings. These were originally armature bearings from Westinghouse type 307 motors. The countershafts were made out of old axles, which had been discarded for worn journals. The gears are of a split type, which were easily mounted on a countershaft, and a keyway was milled in the shaft and a key installed to prevent turning. Lubrication for the countershaft bearings is provided by Galena oil cups taken from some old motors. The sprocket wheels are shrunk on the countershaft. It was necessary to bore these out to provide a larger diameter for the fit, and as the wall of the hub was quite thin, steel bands were shrunk over the outside ends of the hub so as to eliminate the danger of breakage when the sprocket wheels were forced into position.

The nose suspensions for the motors were constructed of 1-in. x 6-in. soft steel. Cross-members which provided the support for the motor were bolted to uprights,



A Special Motor Car with Motors Mounted Above the Floor Hauls a High Platform Trailer

which in turn were bolted directly to planking above the floor. The resistors used in the motor circuit were placed at one end of the car above the floor level and were housed in a wooden box lined with transite. This box was perforated to allow the heat to escape. Protection was also provided over the sprocket wheels. This consisted of a sheet-iron guard, one end of which was bolted to the floor planking, while the other was connected to an angle fastened to the pedestals. The standard gear cases for the motors were used as a housing for the gearing.

The length of the motor car is 22 ft. 4½ in. over all and the roof construction consists of 2-in. x 1-in. rafters resting on ¾-in. x 8-in. boards around the edge. The roofing consists of ¾-in. white pine roof boards covered with 8-oz. canvas duck. The cross braces and end braces were installed to reinforce perpendiculars for supporting the canopy which were a part of the original construction. Two tarpaulin curtains 13 ft. 3 in. x 5 ft. 4 in. are provided for the sides. These roll up behind the letterboard. No curtains are used at the ends as they would obstruct the view of the motorman while observing passengers boarding and

alighting from the trailer. The original draft rigging was reinforced so as to make certain that breakage would not occur, and as a further safety precaution a ¾-in. straight-link chain connects the motor car and trailer.

The trailer selected for this service has 33-in. wheels and double steps so that a high floor level is obtained. Cross and longitudinal seating is provided, which gives a seating capacity for 44 passengers. The trailer is 43 ft. 3 in. over all and has two Brill 27-FE trucks. The regular heating and lighting equipments of the trailer are used and connections are furnished through jumpers with receptacles from the motor car. A single five-light circuit lights the motor car.

This emergency ferry car and trailer is kept at a carhouse convenient to the flooded section, and as soon as inspectors report the water as rising so as to be dangerous to usual operation the emergency equipment is placed in service. The crew consists of a motorman for the motor car and a conductor for the trailer. In usual operation the passengers transfer directly from the ordinary cars to the emergency equipment, but where a delay occurs, emergency transfers are issued.



At Left—Standard Railway Motors Are Geared to a Countershaft. The Drive to the Axle Is by Link Chain and Sprockets. At Right—The Sprockets and Link Chain Drives Are Covered with a Sheet-Iron Housing

Java Starts Electric Trunk Line

Water Power Is Abundant and Coal Is Scarce—First Electrified Division of Dutch East Indies States' Railways Begins Operation on 50th Anniversary of the Day When Funds Were First Voted for Present Steam System

By C. F. Balsem
Railway Staff Dutch East Indies States' Railways,
Bandoeng, Java



This is a 1,500-Volt Express Train Locomotive Built in Switzerland for the Java Electrified States' Railways

ON APRIL 6, 1925, the first section of the electrified States' Railways in the island of Java was opened with ceremonies and in the presence of a large number of the highest officials and the most prominent business men of Java. The day selected for the event was notable for other reasons than for the ceremony because it was the fiftieth anniversary of the day on which the first funds for starting railway building in Java were granted by the Dutch Legislative Council.

The idea of electrifying the Java States' Railways is not new. Years ago plans were drafted for extended electrification because of the excellent results obtained by the electrified sections of various steam railroads in Europe and in the United States. More than any other, probably, the success attained by the first trunk line electrification in Holland, from Rotterdam to The Hague, was urged as a reason for similar action in Java.

At the request of Ch. Engr. van Stipriaan Luisius, managing director of the Java States' Railways, the chief of the western division of those railways, Engr. Damme, visited England, France and other countries in 1911 to study the latest developments in railway electrification. The result of this study was embodied in a voluminous report, warmly recommending railway electrification in Java.

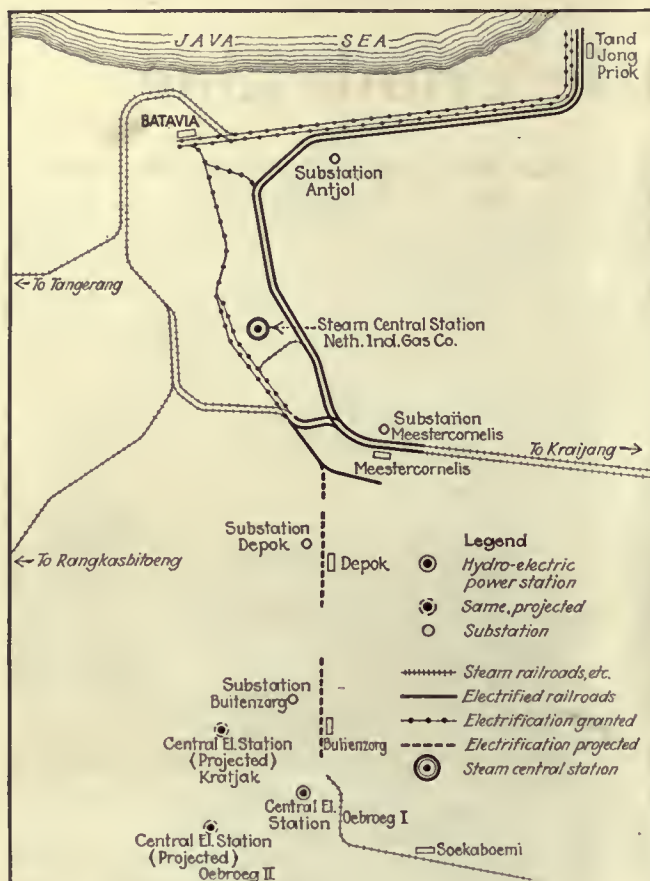
The high costs of construction during the following years delayed the realization of Mr. Damme's recommendation. The development in 1916 on the Chicago, Milwaukee & St. Paul Railroad of high-tension d.c. distribution gave another impetus to the Java project. The great war also emphasized the desirability of electric

traction, because of the scarcity of coal during those years. At that time the price of fuel went to very high figures, and the return of coal prices to pre-war standards seems very distant, if it should ever come. This experience proved the need, in the opinion of the Java railway authorities, of an absolute independence of every country in the matter of fuel for overland transport, especially in a dominion so far from its mother country as is Java.

WATER POWERS ABUNDANT

Fortunately, the island is rich in water powers whose hydro-electric possibilities were again studied. The opportunity with electric power of greatly reducing the number of employees per ton-mile run was also an important consideration. In consequence, in 1915 the former plans were again taken seriously in hand.

Engr. P. A. Roelofsen, now director of the department of government's industries in the Dutch East Indies, but then chief of the water-power division of that department, realized that the hydro-electric development for railway work should be part of a comprehensive plan for general power generation and distribution. By combining the needs of power in industry and in railway service it would be possible, in his opinion, to justify development which otherwise might have to wait many years for fruition. For this reason Mr. Roelofsen proposed in his report of 1917 a power development plan which would supply the industrial demand for electric power in the province of Batavia, and would also furnish the power required to operate the railways in and around the city of Batavia, the railway from Batavia



Map Showing Electrified Division About Batavia,
Java States' Railways

to Buitenzorg, the Governor-General's residence in the mountains of Java, and the lines to Soekaboemi and Tjikampek. The necessary electric power for this plan was to be obtained from two hydro-electric plants.

These proposals were accepted by the government of the Dutch East Indies and approved by the home government. The construction of the two water-power plants was started in 1919 and the following year the States'

Railways began the work of electrification. During the latter part of 1920 the railway part of the work was put under the direction of Dr. Eng. G. de Gelder, who had been sent out from Holland for that purpose.

The necessary energy was to be produced by two powerful hydro-electric plants, located on the Tjitjatih and Tjianten Rivers. The alternating current at 70,000 volts, obtained in those plants, was to be transmitted to the States' Railways' substations at Buitenzorg, Depok, Meester Cornelis and Antjol, there to be transformed to 6,000 volts a.c. At this voltage it was to be delivered to the States' Railways and to the substations for distribution to consumers of electric power and light.

The water-power division was made responsible for the construction and operation of both the hydro-electric plants and the transmission line. The construction and management of the other parts of the equipment, such as the substations and of the electrification of the railway itself, were to be in charge of the electrification division of the States' Railways.

CHANGE IN PLANS NECESSARY

In 1921 all these plans were determined and construction had been begun, when the beginning of the general post-war financial slump compelled a change in the undertaking, and the Dutch government ordered a cessation of further construction. In consequence, the building of the central electric station on the Tjianten River, now called Kratjak station, was temporarily stopped. At the same time the electrification of the railway to Buitenzorg was postponed and the work on the rest of the electrical development in and around Batavia was slowed down.

These measures caused the postponement of the date of completing the first electrified section from the early part of 1923 to the end of 1924.

Under the changed plan the construction of Depok and Buitenzorg substations was temporarily abandoned, but the substations at Meester Cornelis and Antjol were already practically finished. The former substation has a capacity of 3,000 kw. in 1,500-kw. units, and the latter of 4,500 kw. in 1,500-kw. units, to transform the 6,000



This is a Passenger Motor Car, Java States' Railways. The Second-Class Compartment is at One End and the Third-Class at the Other



This Station Looks as If It Might Be in the Occident. Actually It Is at Pasarsenen on the Java States' Railways

volts a.c. to 1,500 volts d.c. This system was chosen as the most desirable for the States' Railways system. The Meester Cornelis substation was finished in September, 1924, and began operation on Dec. 3. Antjol followed in the following January. The equipment for the Meester Cornelis substation was supplied by the General Electric Company of New York and that for the Antjol substation by the Allgemeine Elektrizitäts Gesellschaft of Berlin.

CATENARY CONSTRUCTION USED

The overhead contact system of the Meester Cornelis-Tandjong Priok division employs the catenary system with two parallel contact wires of 107 m.m' section and a copper catenary cable of 150 m.m' section. The Siemens-Schuckert works in Berlin supplied the overhead system complete, with the Enthoven foundry in Delft (Holland) as sub-contractors for the poles, many of which were made in Java.

The length of the electrified Meester Cornelis-Tandjong Priok division consists of 67.7 km. (42.3 miles) measured as single track. The total length of the lines composing the Batavia system amounts to 120 km. (75 miles) in all.

ROLLING STOCK

The electrical rolling stock consists of locomotives and motor cars with trailers. The latter supply most of the passenger service between Batavia and its harbor of Tandjong Priok. The standard train consists of one motor car and one trailer. The exception in the passenger service requiring the use of electric locomotives is in the transport of native coolies to and from their work during the rush hours in the early morning and the afternoon. This will be effected by means of trains of several passenger trail cars hauled by locomotives. Electric locomotives will also be used for freight service and to haul the through-express trains from the direc-

tions of Poerwakarta and Buitenzorg to the suburb of Weltevreden and to the city of Batavia, after their arrival at Meester Cornelis.

For the Batavia division twenty motor units were considered to be necessary. Ten of them were ordered from the Beynes Railway Carriage Works in Haarlem, Holland, and were electrically equipped by the General Electric Company of New York. The delivery of five other units, installed by the Westinghouse Heemaf Electric Works, was intrusted to the Koninklyke Fabriek van Werktuigen en Spoorwegmateriel at Amsterdam. Five other motor units will be ordered later.

The orders for the seven electric locomotives required were placed as follows:

Two express-train locomotives, type 1B-B1, 1,570-hp. capacity at a one-hour rating; maximum speed, 90 km.p.h., from the Allgemeine Elektrizitäts Gesellschaft in Berlin.

Two express-train locomotives, type 1A-AA-A1 of 1,500-hp. capacity at the one-hour rating from Brown, Boveri & Company in Baden, Switzerland.

Two passenger and freight locomotives of 1,200-hp. capacity at the one-hour rating and maximum speed of 60 km.p.h., from the Werkspoor-Westinghouse-Heemaf Company in Holland.

One freight locomotive, type AA-AA, 900-hp. capacity and maximum speed of 60 km.p.h., from the Allgemeine Elektrizitäts Gesellschaft in Berlin.

An order has also been placed for two accumulator switching locomotives with the Werkspoor Siemens-Schuckert Company. These locomotives will be of 360-hp. capacity with a maximum speed of 20 m.p.h.

FARES CHARGED

A zone-fare system is used on the Batavia Electric Railway. The total length of the line, 15.6 km. (9.75 miles), has been divided in three zones and the fares, expressed in American money, are as follows:

For the first zone, first class, 10 cents; second class, 6 cents, and third class (natives), 3 cents.

For two zones, first class, 18 cents; second class, 12 cents, and third class (natives), 6 cents.

For three zones, first class, 24 cents; second class, 16 cents, and third class (natives), 8 cents.

Special trains to carry the mail are run once a week on the dates of mail boats leaving Tandjong Priok harbor for Europe.

MANY NATIVES AMONG EMPLOYEES

The wages of the train and station personnel are rather high as compared with those paid in Europe.

Station masters of European nationality receive as much as \$300 a month in American money. Inspectors and conductors of European nationality receive maximum salaries of \$120 and \$80 respectively in the same time.

Native motormen and locomotive drivers are paid as high as \$70 a month; conductors are paid a maximum of \$28; signal men, \$36; and switchmen, \$13. Besides these payments, a system of premiums for efficient service offers the railway personnel an opportunity for a nice increase in their wages.

As a rule, Europeans are used in the more responsible positions of the staff and natives in those that are less responsible. It should be said, however, that in general the races of the Malay Archipelago, especially those of Java and Sumatra, are easily trained to be good railway men. This is especially true of work in the repair shops where the natives often become very skilled mechanics. Strikes are very rare and never general, and the spirit among the railway men, European as well as native, is generally one of contentment and satisfaction.

Reading Railroad Finds Gas-Electric Car Useful

SINCE being placed in service some time ago on the Trenton branch of the Reading Railroad a gas-electric car has been run approximately 16,000 miles. It gives frequent service between Trenton and Trenton Junction, the main line connection with New York-Philadelphia trains. The total run is 3.7 miles. The service is unusually severe as four station stops are made and operation at times is with a standard trailer. Grades are as steep as 1.1 per cent, but no auxiliary power unit is needed at any time.

Average schedule time for the one-way trip is ten minutes. Layovers at each terminal are from four to ten minutes in duration, giving a minimum round trip of 24 minutes. Without layovers the average schedule speed is 22 m.p.h. A total of 21 round trips is made on weekdays and 23 on Saturdays, giving an average daily mileage of 170. A 110,000-lb. standard steel coach is handled on three of the round trips. This car also handles the switching of express cars at Trenton and the transferring of one 73-ton express car from Trenton to a main line train at the junction.

This gas-electric car has replaced two class Q-1, 2-6-4 type steam locomotives and one coach. The locomotives were of special design for operation in either direction and in normal service ran around the cars, as the layover time at each terminal was inadequate for turning on a wye. For normal operation of the car no extra movement is necessary as the control is arranged for operation from the rear end and unless a trailer is

hauled the operator can run the car from the rear end.

The motive power equipment of the car consists of a gasoline-engine-driven generator, two motors and control apparatus. The engine has a 7½-in. bore and 8-in. stroke and delivers 250 hp. at 1,100 r.p.m. The generator is of a type designed especially for gas-electric cars and supplies power to two 140-hp., 600-volt d.c. motors located on the forward truck of the car. Motors are axle hung and drive through strong solid helical gears, having as 16:61 ratio, which are totally inclosed and run in grease. This large gear reduction was used to give the high tractive effort necessary with trailer operation. Speeds up to 51 m.p.h. have been attained.

The Readers' Forum

The Noise Reduction Committee's Position

DEPARTMENT OF STREET RAILWAYS

DETROIT, MICH., Jan. 27, 1926.

To the Editor:

In the Jan. 23 issue of *ELECTRIC RAILWAY JOURNAL* "Master Mechanic" criticises the work of the noise reduction committee and administers a dose of cold water to the new committee which is to study means of improving appearance and comfort of cars.

While it is true that the report of the noise committee did not stir up much discussion on the floor of the convention, yet that is not conclusive proof that the committee's work was futile. As chairman of that committee I have received several letters from railway officials making further inquiry and indicating that they are giving deep study to the subject. Several roads are experimenting along the lines suggested in the report. On one road, to my personal knowledge, something like \$15,000 has been spent during the past four months to overcome noisy conditions in car equipment. This shows conclusively that noise reduction is a very live problem.

Your correspondent speaks of "theorizing" by the committee. In defense of the committee's work I would like to call attention to the fact that its work and report had to be completed between January and June, or in a period of less than six months. Inasmuch as the committeemen must of necessity superimpose this work on their other labors, they cannot hope to prosecute the task as diligently as though they were free to confine themselves to the one subject. It was felt by the members that if they could present to the association a comprehensive study of the underlying principles of the problem and a summary of all known causes with their possible remedies a good foundation would be laid for further work. It is believed that our report did accomplish that purpose, and that while many of the remedies remain to be proved, there are others that are too obvious to require proof. It is the intent of the committee to conduct research work during the present season so that it may submit in its next report definite results free from the taint of "theorizing."

The other question raised—expense—is one that is being given considerable attention. There are several aspects to this phase. In the first place what will it cost? Unfortunately that cannot be definitely settled, as conditions vary so greatly on different properties. It is the consensus of opinion, however, that whatever

steps are necessary to reduce noise in car equipment, it will call for some initial investment, but ultimately the maintenance costs will be reduced due to the use of higher standards. Secondly, quiet cars have a better sales value, and if car riders are to be won back to the electric lines this becomes a very tangible asset.

The committee hopes to supply the Aladdin's lamp. It will be in the form of facts and figures which will give the equipment man the needed arguments to prove to his manager the results which can be obtained. On the other hand, the equipment man must do his bit. This will consist of application of the findings to his own property and keeping up a continuous barrage of reports until he sells the idea.

H. S. WILLIAMS,

Chairman Noise Reduction Committee A.E.R.E.A.

Small Roads May Create a Large Market for Modern Cars

BEAVER VALLEY TRACTION COMPANY

NEW BRIGHTON, PA., Jan. 23, 1926.

To the Editor:

Your issue of Jan. 16 was of particular interest to me, having just returned from a meeting of the merchandising transportation committee held in New York. In this number there were five editorials dealing with car equipment. Our committee considers that the car is the show window of our industry.

It is inspiring to note in the recent issues of the JOURNAL the prominence given to the proposition of replacing obsolete electric railway cars.

Recently a small railway company held a meeting of the department heads to discuss specifications of several new cars that were to be purchased. At this conference the question was asked whether it would be possible for the car manufacturers to furnish a unit that would contain comfortable seats and the body so designed that the eye would not be offended with the awkward looks of platform and other equipment. This is just one concrete example of the appreciation of electric railway employees that there is a growing demand for a car unit which will be a better merchandising unit. Undoubtedly the manufacturers will bring out new designs to meet this demand.

A combined purchasing power, perhaps beyond present realization, may be possible among the smaller companies alone when the greater earning power of a modern ride-inviting car is thoroughly demonstrated.

Your recent articles and editorials on this subject certainly have made interesting and inspiring reading.

CLINTON D. SMITH,

General Manager.

Buses Faster than Electric Cars in New York

NEW YORK, Jan. 25, 1926.

To the Editor:

Some of your readers may get a wrong impression from the short article in your issue of Jan. 9 entitled "Cars Faster than Buses in Test" and believe that as a rule better time is made by street cars in Manhattan Borough, New York, than by the buses of the Fifth Avenue Coach Company. The period selected for the test was between 5 p.m. and 6 p.m. on a single day during December, when Fifth Avenue was crowded with shopping traffic for a large part of the section chosen for the test; i.e., that between Fourteenth Street and 57th Street. It is perhaps only to be expected that buses on Fifth Avenue, when it is crowded with

Christmas shopping traffic, will make slower time than electric cars on Third Avenue, which run on what is almost a reservation in the center of the street, because of the elevated pillars on each side of the car tracks.

That street cars on the average make better speed on Manhattan Island than buses is not correct. One has only to turn to the reports of the New York Transit Commission and determine the vehicle speeds of the different companies, including layovers and delays, by dividing the vehicle-miles by the vehicle-hours. These for the year ended June 30, 1925, show the following for the surface cars: New York Railways, 6.6 m.p.h.; New York & Harlem Railroad, 6.8 m.p.h.; Third Avenue lines below the Harlem River, 6.6 m.p.h. During this period, however, according to the same method of calculation, the buses of the Fifth Avenue Coach Company in Manhattan Borough operated at an average speed of 8.1 m.p.h., or were considerably more than 1 m.p.h. faster than the average for the cars of any of the surface systems mentioned.

TRANSPORTATION.

Uniform Signboard Advertising on Main Highways

By D. H. WALKER

Assistant Engineer Terre Haute, Indianapolis & Eastern Traction Company

AT SEVERAL locations along main arterial highways the Terre Haute, Indianapolis & Eastern Traction Company has erected large signboards advertising its service. The majority of these signs have been placed on carhouse or power house property, but some are simply on the right of way at junction points of main highways or near towns. Signs are placed at a sufficient distance from the road to make them clearly visible to passing vehicular traffic. Since all the signs



Typical Advertising Sign of the T. H., I. & E. T. Co. Along the Jackson Highway, Which Runs from Chicago to Florida

are placed on company property they bear no rental charges. In some instances they have been so located that they may be seen from passing interurbans, but the governing factor has been to make them seen by the occupants of passing vehicles. Lighting at night has been tried on some and will soon be installed on all.

Signboards are made 12 ft. high and 30 ft. long with a large diamond emblem of the T. H., I. & E. lines painted in the center. In the four corners are hung boards 2 ft. x 10 ft., which carry the various advertising messages and slogans. The boards are changed at regular intervals and new advertising substituted. All work in connection with erection of signboards and changes of advertising is done by company forces. Messages stress the speed of freight handling and the convenience of fast limited and local passenger services. Pertinent facts concerning the electric railway industry as a whole, and the Middle Western lines particularly, are also placed on the boards.

Association News & Discussions

Improvements for All Departments Discussed by New York Association

Papers Were Presented on Painting, the Use of Buses by Electric Railways, Co-operation of All Departments, Safety, Training Future Executives and Economical Practices—Annual Dinner Important Feature of Program

PROVIDING attractive, up-to-date equipment and improving all departments was the keynote of the mid-winter meeting of the New York Electric Railway Association held at the Commodore Hotel, New York City, on Jan. 27. In his opening address President William J. Harvie reviewed the progress that electric railways have made from the horse car days and discussed briefly the coming of the bus into the general scheme of transportation and its rapid advance in use. Attractive, up-to-date equipment designed for comfort rather than luxury was pointed to as a desirable result to be obtained. An abstract of Mr. Harvie's address appears in other columns of this issue.

Present-day practices in car painting were given in a paper by Samuel S. Demarest, abstracted elsewhere in this issue. Following the presentation of the paper Mr. Demarest gave some detailed costs of applying the three systems of painting referred to. These costs substantiate the general statements given in the paper.

E. A. Murphy, general manager United Traction Company, Albany, read a paper entitled "Destroying a Service Which It Cannot Replace." An abstract of the paper appears elsewhere in this issue. Discussing Mr. Murphy's paper, George MacLeod, vice-president and general manager Buffalo & Erie Railway, Fredonia, described the operating and fare collection methods employed by this company. He said that experiments are being made with an auxiliary magnetic brake.

The question was asked whether any of the railway men in the audience knew of an instance where the bus had been successful in handling mass transportation. Mr. Murphy replied that experience in Albany indicated that the bus could not handle mass transportation. He mentioned the desirability of having buses of larger carrying capacity than the 29-passenger vehicle now used in that city, but stated that overhanging trees prevented the use of double-deck buses. Experiments are being made with an eight-wheel bus, he said.

Successful use of a weekly pass on the West Penn Railways as a means of solving the fare collection problem with one-man cars was described by Walter Jackson, consultant, Mount

Vernon. In regard to speed, Mr. Jackson pointed out that the double-deck bus is inherently a slow vehicle.

"Internal Co-operation" was the subject of a paper presented by C. P. Segard, assistant secretary Third Avenue Railway System, New York City. A paper, "Potential Executives in the Rank and File," by R. E. Danforth, formerly vice-president and general manager Public Service Railway, New Jersey, was read by Martin Schreiber, manager southern division Public Service Railway, in the absence of Mr. Danforth. "Points on Which City and Traction Officials Should Agree" was the subject of a paper by W. P. Capes, director New York State Bureau of Municipal Research. No discussion followed the presentation of any of these three papers. Abstracts appear elsewhere in this issue.

Barron G. Collier had been unavoidably detained out of town and was unable to write a paper.

Alfred T. Davison, general counsel Third Avenue Railway System, delivered a talk on accident prevention as practiced by his company.

Education before the accident occurs rather than discipline afterward is the plan on which the recent work of the Third Avenue Railway System has been conducted. For two years this company has filed all of its accidents on the seven-point system. The record of each accident is written with six carbon copies, which with the original make seven, and these copies are filed under the seven different classifications which might serve later to identify them. One record is under the name of the party injured, the second under the address given, third the date, fourth the line on which it occurred, fifth the car number involved in the accident, sixth the motorman involved, and seventh the conductor involved. Periodically a statement is made up showing the location of all accidents.

An analysis of the accidents shows that in 25 per cent of the accidents the company was at fault, and in 75 per cent the company was not at fault. The efforts of the company are directed toward reducing the 25 per cent of accidents at fault, and attempting to prevent recurrence of accidents falling in the 75 per cent class, and at the same time educating the operating department so that the claim department

will have sufficient witnesses and other data that will aid in preventing payment of money if the cases come to court.

The company often pays large sums of money in settlement of accident claims falling in the 75 per cent not-at-fault class, because proper witnesses were not obtained, and trainmen are impressed that they are responsible not only to reduce accidents but to protect their company in connection with all accidents whether they are in fault or not. The company is also trying to impress trainmen that often serious accidents may result from apparently trivial things. A car that is allowed to roll only a few inches after the doors are opened may cause a serious accident to a feeble person who may be boarding or alighting.

The latest effort of the company to analyze accidents was started in November. Due to this work the serious accidents have been materially reduced. For the three months August, September and October of last year the serious accidents on this system averaged 1,719, whereas for November and December they averaged 1,632.

An interesting point used to prevail upon the trainmen and operating forces is that the company is now paying out twice as much money for accidents as it did ten years ago, and that the same care applied now as ten years ago would save from two to three times the amount of money.

Following Mr. Davison's talk, the question was asked from the floor as to how the company informed the men relative to the statistics of accidents, to which Mr. Davison replied that the road instructors, road men and superintendents must attend the weekly conferences, when they and others analyze the accidents. These officials then take up the analysis with the trainmen, and in this way carry much information directly to the trainmen.

To the question asked by President Harvie as to what effect this work is having on the 75 per cent of accidents not at fault, Mr. Davison answered that this could not be determined for perhaps a year, as it took at least this amount of time finally to dispose of cases that may be brought to trial. The answer would be the amount of money the company had to pay out in the settlements as compared to years prior to this work.

Charles H. Clark, engineer in charge of maintenance of way Cleveland Railway, then presented seven reels of moving pictures which illustrated many features of interest in the operation of his company. First his audience was permitted to take a ride down Euclid Avenue on the top of one of the Cleveland Railway's six-wheel double-deck buses. Surviving this experience safely,

they then were conducted through the extensive maintenance and production shops, where many of the labor-saving devices developed by the engineers of the company were in operation.

A trip to various sections of the right-of-way was included in order to illustrate the methods employed in track and pavement construction and in general roadbed maintenance.

Several of the reels were prepared specially for showing at this meeting, while others were taken previously. Following the showing of the pictures, President Harvie declared the business session adjourned.

The dinner meeting, scheduled for 6:30 convened shortly after, and was eminently successful. Edward F.

Wickwire, vice-president of the Ohio Brass Company, Mansfield, Ohio, talked on "The Jolly Trolleying Public." The paper was filled with similes presented in the inimitable style for which Mr. Wickwire has become famous.

John A. Ritchie, president Yellow Truck & Coach Manufacturing Company, followed with a paper on "The Place of the Motor Bus in Co-ordinated Urban Transportation." Abstracts of both of these papers appear elsewhere.

The dinner was interspersed with good entertaining features and closed with a talk by Strickland Gillian, a humorist of note.

During the day the meetings were well attended and 437 members and guests attended the dinner.

We are then once more facing a new condition; not a complete transition from one form of transportation to another form, as before, but a partial transition and a revamping of our methods, so that by the addition of the bus we may furnish a more complete and more extensive transportation service than was possible before.

Our danger is that some of us may feel that we are facing a complete transition in existing transportation facilities and the consequent general disappearance of electric cars, and, indeed, some of our citizens do think so. I do not share this thought, for as long as large numbers of people desire to be transported by a public conveyance from place to place at about the same time, or continuously for a period, the electric car will be the most expeditious method by which it may be accomplished.

The fundamental need of the traveling public is the same today as it always was, although we are inclined to lose sight of that fact when we view around us the increasing tendency of our public to provide its own individual transportation service. This method we know to be the most expensive for the individual, and, from the community standpoint, most uneconomical of street space.

What is the type of equipment with which to attract patronage? It seems to me that the equipment should be what may be described as comfortable, not luxurious. So-called de luxe equipment is quite another matter, and rightfully calls for an extra charge. The question of size of units and headways should fit the needs of the public which is to be served. The equipment selected must, of course, be adaptable to highly economical operation. These considerations are of prime importance and are of equal force whether applied to electric street cars, buses or other means of public transportation.

Present-day conditions make it necessary for us to take stock of ourselves and our industry and, having in mind the fundamental needs, adapt our equipment and methods to present-day ideas of good service.

Let us not imagine that supplying plush seats with double cushions and putting tapestry curtains at the windows will suffice to increase permanently our present patronage or to win back lost customers. The average user of the electric railway does not seriously care for such refinements. If he can ride in reasonable comfort and reach his destination quickly he will be quite satisfied that he has full value for his fare. Neither do I think the average citizen cares what colors or decorations we use on our cars or buses so long as they do not offend the eye.

Consider your investments in equipment in the light of common sense and good judgment. Meet changing conditions with the right perspective. Do not permit good judgment to be warped by the present tendency to furnish de luxe service where only plebeian returns are possible, nor go to the other extreme of furnishing less than a comfortable ride to your passengers for economic reasons, and then expect your public to give you its support.

What Type of Equipment Will Attract Patronage?*

By W. J. HARVIE

Vice-President and General Manager Auburn & Syracuse Electric Railroad

DURING the time this association has been in existence we have witnessed many new developments in transportation methods. We are witnessing other developments in the methods used in public transportation, and we must not close our eyes to new requirements, both actual and fancied, as they present themselves.

Fundamental during all this time have been two thoughts, attractive, up-to-date equipment and economical operation. Great progress has been made along both of these lines in so far as those factors were concerned over which we had control. We have undertaken to meet changing conditions as they arose and as new needs and habits became apparent.

Many of you will recall a time some years ago when our sole idea seemed to be to operate electric cars which in the light of later experience were far too heavy. Within a period more recent we were installing on our lines the very lightest possible equipment, and were listening to debates regarding the cost per annum of carrying the weight of the paint which we applied to our light equipment; certainly an amazing example of going from one extreme to the other. Neither type of equipment was satisfactory; both were the result of a sincere effort on the part of railway operators and investors to furnish, in the first instance, what was then termed attractive, and even luxurious, equipment for the use of our public, and in the latter instance an effort to furnish attractive, though not luxurious, service, the main object being to reduce to the lowest figure the cost of furnishing that service. Both of these efforts were commendatory, but, in the light of experience, both went too far.

Some time just prior to 1922 a new form of transportation, the motor bus, began to make itself known. Its presence was not seriously noticed at first, but our public received it well, and it soon began to gain in popular favor.

Its influence on our industry was not great, for in 1922 the bus carried but one-tenth of 1 per cent of the number of passengers carried on the electric cars. However, this small percentage amounted to more than sixteen million persons, and, as you know, the number has been increasing since that time.

COMING MEETINGS

OF

Electric Railway and Allied Associations

Feb. 4—New England Street Railway Club, Copley Plaza Hotel, Boston, Mass.

Feb. 5—Metropolitan Section, American Electric Railway Association, Engineering Societies Building, 29 West 39th Street, New York, N. Y., 8 p.m.

Feb. 8-11—American Institute of Electrical Engineers, midwinter convention, 29 West 39th Street, New York, N. Y.

Feb. 11—Central Electric Railway Master Mechanics' Association, Portage Hotel, Akron, Ohio.

Feb. 18—A. S. C. E., A. S. M. E., A. I. E. E. and A. I. M. M. E., joint meeting, Engineering Societies Building, New York, N. Y., 8-15 p.m.

Feb. 24-26—Electric Railway Association of Equipment Men, Southern Properties, Mobile, Ala.

March 8-11—National Railway Appliance Association, annual exhibition, Coliseum and Annex, Chicago, Ill.

March 9-11—Oklahoma Utilities Association, annual convention, Mayo Hotel, Tulsa Okla.

March 17-18—Illinois Electric Railway Association, Illinois State Electric Association and Illinois Gas Association, annual joint convention, Springfield, Ill.

April 13-16—Southwestern Public Service Association, Galveston, Tex.

*Abstract of paper delivered at midwinter meeting of New York Electric Railway Association, New York, N. Y., Jan. 27, 1926.

Present-Day Car Painting*

BY SAMUEL S. DEMAREST
Pratt & Lambert Company

FOR exterior car painting, be the surface wood or metal, there are three standard methods of application in vogue today. The first operation in car finishing or painting, after thoroughly cleaning the surfaces to be decorated, is priming. The priming coat may be applied by brush or spray and the material or primer used may be clear or it may contain pigment. In any event, whatever form of primer is used, on wooden surfaces it should be well worked into the surface. Many painters insist on white lead and oil for priming over wood; this practice is sound but not essential, for there are many long oil primers on the market today which insure equally efficient returns. Primers for use over metal surfaces, in the estimation of many authorities, should contain certain rust preventing or retarding properties; that is, be made up with admixtures of pigments such as red lead, blue lead or red oxide of iron; again, satisfactory results are shown where clear primers are used directly over the metal. Primers provide the base upon which the succeeding coats depend. They must of necessity be long in oil in order to give the maximum of adhesion and provide proper elasticity.

Surfacing coats follow the priming operation. They provide a workability for sanding or rubbing, which creates a smooth, flawless base, ready for the finish coats. Surfacing are supplied in knifing and brushing consistencies. Knifing coats, which fill and hide all minute indentations or abrasions of the wood or metal, are applied with a putty knife. Brush-coating surfacer may be applied by brushing or spraying. There are no fixed rules as to the number of surfacing coats required; this depends solely upon the condition of the surface being treated and the fineness of the ultimate finish desired. Surfacing in their make-up should be short enough to insure being rubbed or sanded smooth without arduous labor and yet long enough in oil to prevent absorption of color coats and to allow for the contractive and expansive action in metal car bodies without disintegrating. All large holes or depressions in wooden or steel bodies are filled with putty or some kindred product in between the surfacing coats.

When flat colors, known as colors in Japan; car body coatings or enamels are used directly over the surfacing coats in order to obtain certain color schemes and these are followed by varnish coats, the plan of finish is known as the color and varnish system. This generally consists of one or two coats of color body applied directly over the smoothly rubbed or sanded surfacer, followed by one coat of rubbing varnish and one or more coats of finishing varnish.

Where one or more coats of long oil enamel follow the surfacing operations the system is known as an enamel system. The lacquer enamel system con-

sists of the spray application of two or more coats of lacquer into which color pigments have been incorporated, over especially adapted primers and surfacers applied as above.

Due primarily to savings in labor costs, accounted for by its demands for a minimum number of coats, the enamel system represents the most economical method of exterior car finishing in use today. The color and varnish system stands second in this comparison and is about midway between the enamel and the lacquer enamel systems, the latter of which is the most expensive on original application. Many manufacturers feel the time is not far distant when increased production of lacquer enamels will bring the costs of these materials down to a level where the lacquer enamel system will prove the most economical from an original application standpoint of view.

Expressions as to time required for car shopping for painting vary slightly. The lacquer enamel system in our estimation now provides the fastest schedule of car finishing and this schedule will doubtless be reduced as new products going into the make-up of the system are developed and application methods for the materials themselves are perfected. The enamel system follows closely the lacquer enamel system in this connection, the color and varnish system standing last.

For sheer downright beauty and appearance of finish the color and varnish system, for a time, undoubtedly excels other systems in the sight of the most exacting. The high luster imparted to car bodies through the final coats of good finishing varnishes bespeaks a newness and cleanliness appealing to many operating officials. Comparative ease of cleaning and weathering, however, soon dim this first high luster and the sheen of the finish continues to go backward throughout the life of the job.

Several manufacturers of enamels have more recently incorporated into their products a luster which enables them to give a finish in their enamel systems vying closely with that obtained through the use of the color and varnish system. In the instance of the enamel system the luster of the final coatings recedes very slowly, and in a relatively short time, under identical conditions, the sheen of the finish secured through the use of the enamel system surpasses that given by the color and varnish system. The enamel system presents a surface readily cleanable if the proper cleaning compounds are used. The lacquer system now offers, in appearance, what is known as an eggshell finish. Surfaces to which lacquer enamels have been applied are, in most cases, easily cleaned with practically any form of cleaner and the finish itself picks up added luster through continued washing.

The color and varnish system lends itself readily to the various forms of striping, lettering and numbering, and especially is this so where that work is

done in gold or aluminum leaf. Gold and aluminum leaf must be varnished, if only pencil varnished, for protection against the elements, all of which means extra operations where the enamel or lacquer enamel system is used. To offset this feature imitation gold and aluminum enamels have been developed for use in striping, lettering and numbering over enamels and lacquer enamels.

Refinishing costs in connection with the various systems of car painting are the issue commonly overlooked by operating officials in selecting a desired type of finish, and yet they represent almost as important a factor to the railway company as does the original combination applied to the car. If cars painted with the color and varnish system are not left on the road too long, they can in many instances be brought back to practically their original appearance through the application of but one coat of finishing varnish; this plan would frequently necessitate taking cars out of service for painting alone instead of refinishing only at the time of general car overhaul.

Where the color and varnish system is allowed to deteriorate too far it is an expensive system to employ from a refinishing point of view. The enamel system can be brought back to its original appearance at the time of car overhaul, through the application of but one coat of enamel directly over the old finish.

On first development, lacquer products bore so much of promise toward that goal of speed and endless service that enthusiastic sales representatives oversold themselves on it and they, in turn, oversold their ideas. Multicolored cars have in a measure been a stumbling block for lacquer application. Lacquer, thus far, has shown a tendency to serve better on exterior metal surfaces than on wood, its supposed highly inflammable composition leading it to be discarded by some without second thought. Some tried it and in certain instances it failed.

Destroying a Service Which Cannot Be Replaced*

BY ERNEST MURPHY

General Manager United Traction Company,
Hudson Valley Railway Company, Capitol
District Transportation Company,
Albany, N. Y.

BUILDERS of the program for this meeting were almost as generous as the grizzled veteran in the colored congregation. The new minister had asked him to select a text on which he could speak, whereupon he pointed to the sentence, "This is the beginning and the ending."

Taking for granted the bare, broad statement that the automobile and the automobile riders have cut enormously into the earnings of the street railway companies, causing in many instances lines to be operated at a constantly increasing loss, the question naturally arises: When is the automobile used for pleasure and when is it used for business? Is it used for business when

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the owner rides to work in the morning, picking up a number of friends who might be prospective street car passengers and then leaves his car parked all day to obstruct normal traffic, so that it must move in a 16-ft. lane left between parked cars? The delays caused by traffic congestion in city streets due to parking is a problem felt by every operator in cities large and small.

Our own experience has been to re-view completely the several lines as to earnings, expenses and reconstruction costs, and where the reconstruction costs were such that the operating revenue did not warrant a reproduction in kind of the structures, the trolley lines were abandoned and buses substituted. Since the installation of our first bus operation, experience has proved that the buses hold the passenger traffic and in some instances apparently induced additional traffic over the lines.

Use of the double-deck bus in Albany was practically prohibited by overhanging trees, so that the 29-passenger

single type was adopted. However, on certain lines it would be desirable to have a vehicle with a larger capacity for operation during the morning and evening peak loads.

The popularity of buses over the trolley cars is quite evident. The traveling public seems to be better pleased with riding on rubber wheels than on steel wheels and rails. There is no question about the fact that transportation by bus is quicker, and the people get to and from their work in less time than they did by the trolley lines which have been abandoned. It is unquestionably safer, because of the manner of boarding and alighting from buses as compared with the trolley car. The operation cannot be suspended by obstructions on the street.

The people today would not go back to the old sailing vessel for transportation; nor to the horse car. With care exercised by a railway management as to lines which could better be operated by the substitution of bus transportation, our experience tells us that such substitution is justifiable.

Internal Co-operation*

By CHRISTIAN P. SEGARD, M.D.

Assistant Secretary Third Avenue Railway, New York

MANY of the lessons that we wish to mark indelibly on the juvenile mind of today are learned, not in the schoolroom, but on the play field. Perhaps the most important rule of all games in which more than one individual takes part is the unwritten law of team work. And team work of whatever kind, whether in games or in industry, requires as its counterpart, knowledge. The word co-operation might be substituted for team work.

Let us examine some of the causative factors of non-co-operation.

1. A lack of knowledge of the whole and the purpose of its parts leads to non-co-operation. The man whose job is fitting a bearing or setting up some bolts can never have the same interest in the completed product as the man who in former days did almost the entire job and in addition tested the product and saw it work.

2. The highly trained specialist who has devoted all his time to the study of one particular phase of industry naturally shows less interest in industry's other phases. It seems that the specialist has broadened his basic knowledge of one particular phase at the expense of his interest in all other phases. Interest and knowledge of the component parts of industry beget co-operation.

3. Many times the common objective of the whole is replaced by a lesser objective of one of the parts. In our anxiety to excel within a department we may throw a great burden on some other department far outweighing the excellence gained.

4. An unwillingness to accept suggestions or information when offered. The least we can do when a suggestion is made or information offered is to

accept it with the same degree of interest that inspired it.

5. And last but not least we have the most interesting if not the most common cause of non-co-operation and that is the characteristics of the human being himself. Human weaknesses such as self-interest, jealousy, fear and intentional non-co-operation should probably head the long list.

METHODS TO SECURE CO-OPERATION

We can't just talk about co-operation, we must lay down some few methods by which it can be accomplished. The following are ten factors involved in securing co-operation:

1. The common objective of the whole is the most important factor. Unified effort to attain this common objective is essential to growth. No one individual and no one department is of more importance than another. The individual and the department are each an integral part of the whole.

2. Information. How often have we heard the statement, "Why didn't I know this before?" meaning, "why didn't I get information?" Many a good piece of equipment and many a sound proposition has failed because of failure to co-operate with the forces that were directly concerned with making the proposed change an unqualified success.

3. Suggestions whether verbal or written are one of the means by which we understand that the individual is trying to co-operate. Very frequently we find that a suggestion may come from an entirely unexpected source and refer to something entirely outside of the department. Anyone offering any suggestion for the good of the company is entitled to our respect and a hearing. He is showing his willingness to co-operate.

4. To attain co-operation it is neces-

sary that there be mutual respect. Without respect for our associates, superiors and organization, we certainly cannot secure harmony, efficiency or co-operation.

5. If we cannot effect co-operation we may be able to effect compromise. Two departments were using the same expensive material, but of a different quality. The difference was small, yet it was necessary for the storeroom to stock both qualities. One size could have been completely eliminated had these two departments been willing to compromise on one quality which could easily have been used for both jobs. The purchasing agent and storekeeper could frequently show us where a saving could be made if slight differences in size and quality specifications were eliminated.

6. How very often have we found in our own experience that we are very human in our willingness to receive approbation and yet so very unwilling to give our approval to those associated with us. This is a most inconsistent form of human weakness and can only be overcome through conscious effort. Exceptional effort is entitled to commendation just as mistakes require criticism. Commendations need publicity, criticism must be private.

7. Inter-departmental co-operation. How often have any of us gone to another executive or department head and said plainly, so there could be no misunderstanding, "How can my department co-operate with yours?" Unless we ourselves invite co-operation it is unreasonable to expect to receive it.

8. Conferences (of the heads of departments). One of the most abused words in the English language is the word conference as related to a meeting of a group of executives. The reason for this is that the purpose of a conference is information and to determine policy. When we begin to hold conferences to determine method, we are belittling the conference and needlessly consuming time. This, however, does not eliminate group discussion within a department on methods of carrying out a predetermined policy of the whole.

9. Contact. If there is one thing more than another that will beget co-operation it is personal contact. This can be established not only within the department but between departments. Heads of departments see, hear and grasp many points with relation to other departments that would be invaluable if passed on.

10. Programming. The most exact method that can be used by a department head for the securing of a plan for himself that will include his own department is to program the future. By programming is meant the simple process of putting down on paper the tasks for a definite period. Every link whereby the department relates itself to every other department is included in the program. It is an advance record of future co-operation.

There is an oriental saying that "It is just as easy to walk with a man as it is to walk four paces behind him." It is easier to compromise and co-operate with a man than it is to offer obstruction and opposition.

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Training Potential Executives in the Rank and File*

BY R. E. DANFORTH

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SUCCESSFUL continuance of the electric railway as an effective, reliable and economical mode of public transportation depends upon training of potential executives in the rank and file. It is not a new subject. It does not concern a problem peculiar to our industry. History fails to reach far enough back in the ages to mark its origin. It is universal wherever a group of individuals work under a leader, or leaders, to a common end—the perpetuation of authority and ability to control or direct.

If the employing agency has selected for employment men and women of good health, good character, a clean record, fair education, normal intelligence and a good disposition or cheerfulness, we may say safely that given proper supervision and training, able executives may be obtained from the rank and file of the employees. The great difficulty is, however, that the terms of the qualifying clause are often, if not usually, ignored in actual practice, as found upon our electric railways—not to say upon industrial concerns generally. "Given proper supervision and training"—that is where we are weak—where we generally fall down.

Experience alone does not fully equip the individual for an executive position, nor does education, whether technical, legal, scientific or classical. No, nor do the two together, great as their combined values are. Neither does ability to plan and devise ways and means to accomplish any purpose or work. Other qualities are needed today, including the ability to express one's ideas clearly and to get them across to others successfully.

Characteristics which are inborn in the man are of equal importance with those developed through training and experience. Good old-fashioned virtues they are and, praise be, so often found in the rank and file of our own employees. Honesty, loyalty, courage or determination to see a thing through, kindness with its gift for making friends, enthusiasm for the job or the business, vision—eyes and brain that see things as they are and as they should or will be—all compounded into good old horse sense and gumption.

Given the specifications and the raw material, how are we to go about developing the executives of the future? Leave it to George, or to chance? No—of course not. The chief executive of a large system may not know personally all of the thousand or more employees under him. On such a system, however, there are other executives who can and should know the men in their own departments, and have at hand the personal records of many, if not of all of them. It is someone's business to know, and that indi-

vidual is under a heavy obligation to his company and to its employees to see to it, first, that each employee does well his particular task; second, to see that he is properly fitted for advancement when opportunity offers, and third, to see that individual records show the good points of each employee and that such record is in due time made known to the executive who selects individuals for promotion.

Managerial timber is to be found in nearly every organization of average size. The problem is to find and develop it for use. The minor supervisory positions are usually filled from the workers in the particular department involved, and the selection is often too haphazard. Knowledge of the work and practice of other departments is valuable to those who are suitable for continued advancement. Opportunity to gain such knowledge should be given to the more able and progressive of the organization.

I advocate the systematic training of promising young men for executive positions—young men selected for the purpose when hired, or soon thereafter. Where possible, high school graduates should be shifted from department to department systematically during the first year or two of employment, in order to give them a general working knowledge of and sympathy with the methods and problems of each. These young men may then be placed in the ranks of any department and be per-

mitted to grow up there until age, experience, evident ability to progress and personal records show them ready for promotion. I would call such young men "apprentices."

Others who have had a college education may be put through a "cadet engineer's course. After completing this with satisfaction they may be placed in some minor supervisory position or used as executive clerks to the general manager, superintendent or head of department, or be placed on the engineering staff, to be later transferred and used as occasion warrants. Many men now in positions of high responsibility were so trained.

We may often make mistakes in selecting these young men for apprentices or cadets. We may later find them not suited for the railway business. Therefore, the weeding out process, based upon a more intimate knowledge of the young man's ability and his probable fitness for railway executive work, is necessary. Let the weeding begin soon—but not too soon. Some develop slowly. Some have to unlearn many things before their true worth is made evident.

Look within your organization for men capable of being trained to carry on, and spare no effort to develop within the organization's ranks: Esprit de corps, knowledge of how to serve the public, the habit of courtesy, of economy and of willingness—of eagerness to learn new ways and up-to-date methods of operation and of service, and the fixed idea all up and down the line that an official's prime duty is promptly to train, develop and have ready at hand a fit man to take over his job when he himself steps up—or out.

Points on Which Traction and City Officials Should Agree*

BY WILLIAM PAW CAPES

Director New York State Bureau of Municipal Research

CITIES are in a quandary as to the correct solution of the transportation problem and proper regulations for existing services. We are in a period of evolution so far as urban and interurban transportation is concerned. Is the continuance of the street railway a public necessity in all or some communities or in none? Is the motor bus an essential utility in all or some communities? If so, should it supplant the trolley car? Should it be permitted to compete with the street railway? Should it be used as a feeder for the street railway? Will the trackless trolley help to solve the transportation problem? Will science develop some new and more economical methods of transporting people? If buses are an essential utility, who shall the city permit to operate them? What regulations should be made for bus transportation. With street railways being rapidly relieved of the essentials of monopoly which they heretofore enjoyed, should regulation of their rates and services be made less severe? These are only a few of the many questions vital to transportation of the

future to which the cities are seeking the correct answer.

Urban and interurban transportation is more flexible and less monopolistic than ever before. Even climatic conditions affect the degree of flexibility and monopoly. The private automobile has made transportation of human beings almost a seasonal occupation. The resulting complicated situation is appreciated by the public official.

Nevertheless the public wants transportation service, efficient and economical, at any time it sees fit to use it. The prosperity of the community requires such a service. The public holds its public servants responsible either for providing it or insisting that it be provided. The public officials are, therefore, thinking hard and acting cautiously. Officials of the transportation company are in about the same uncomfortable and complex situation. Therefore, the two first points on which public and company officials should agree

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are those of establishing confidence and co-operating to seek correct answers to the many questions that are vital to the interest of those they represent.

There are two other points on which public and street railway officials should agree. The first relates to the provisions of law in respect to pavements which railway companies must construct and maintain. Most of the cities and all of the traction companies agree that the present law should be modified to permit a greater flexibility in determining for how much paving area the company should be held responsible. The present provisions are too rigid. No general law, however comprehensive, may satisfactorily completely and fairly take care of paving charges either in all municipalities or even in a single municipality. Different localities present different requirements as to the paving area.

The only way to avoid litigation, misunderstanding and bickerings is by fixing a definite area for which traction companies would be held accountable. The extent of this area will vary as previously indicated. I, therefore, present for your serious, and I hope favorable, consideration the suggestion that the present law be amended so as to provide that surface railway companies shall be compelled to construct and maintain pavements contiguous to their tracks, the area to be determined by ordinance of the local legislative body upon the recommendation of the city engineer; provided that such amendment will not permit a greater area than that now prescribed by law and will in no way abrogate or change any franchise provision or contract now in force in respect to paving.

All of the proposals which representatives of the traction companies have submitted make the corporations responsible for pavements damaged by the existence of the tracks in the streets, such damages to be determined by the city and the traction company or by the Public Service Commission. The adoption of such a proposition would lead to endless litigation, misunderstanding and bickering which would cost the companies in legal services and good will a large share of the amount they hope to save through a change in the law.

My last point deals with delayed trolley service resulting from traffic congestion due to the parking of motor vehicles. Our studies show that in many cities this is a serious problem. The cities of New York State, through the State Bureau of Municipal Information, have investigated the parking problem and recommended a complete parking program for any city. Those recommendations which will be of particular interest to your association are as follows:

In view of the fact that traffic will continue to increase and that attempts to relieve congestion by parking time limits, traffic diversion and other restrictions do not and cannot satisfactorily and finally care for the interest of the public generally, the merchant or the automobile owner, it seems evident that eventually cities will be forced to prohibit street parking within and adjacent to congested districts, except in unusually wide streets. To put such a regulation into effect at one time and for the entire district, however, would be too drastic a step. It would for a time at least, seriously affect business conditions unless near-by off-street parking places were pro-

vided, and no city at the present time has adequate facilities for the parking and storage of vehicles off-street and conveniently located. For these reasons we believe that cities should undertake a gradual prohibition, as the needs require. They should apply the prohibition first to the most seriously congested thoroughfares and gradually extend the regulation as the pressing needs require and off-street parking facilities will permit.

We believe that in congested districts no parking should be allowed in a street in which street cars operate unless there is room for at least one line of travel, 10 ft. in width, between the street car area and the line of vehicles parked at the curb. This is the very minimum under which parking should be allowed. This will not, however, solve the parking problem, for traffic will be impeded and often interrupted and the fire hazard will be great. Under such conditions, and with parallel parking, the minimum width of roadway should be as follows: streets with a single trolley line, 47-ft. roadway; streets with a double trolley line, 57-ft. roadway.

Traffic will not be seriously affected and fire hazards will be practically eliminated if parking is allowed only in a congested street, the roadway of which will accommodate two lines of moving traffic and one line of parked cars between the street car area and the curb. Under such conditions, and with parallel parking, the minimum width of roadway should be as follows: streets with a single trolley line, 67-ft. roadway; streets with a double trolley line, 77-ft. roadway.

Whether or not parking should be prohibited absolutely or in part in streets

whose widths are greater than those above specified, depends upon traffic conditions. No general recommendation can be made for these.

It needs no argument by me to convince you that if these recommendations were made effective in every municipality, your troubles so far as delays resulting from congestion are concerned would be eliminated. Why are they not adopted? That question brings the discussion on this point to a head.

In approaching the street parking problem, cities must consider the needs and desires of three groups: the public generally, the business man and merchant and the motorist. It is exceedingly difficult, if not almost impossible, to provide regulations that will meet all needs and satisfy all desires.

If you expect the city to regulate parking so as to eliminate trolley car delay, you must give those officials who make and enforce regulation your unstinted moral support. They will need all the help that you and others interested in efficient transportation can give them to prevent selfish interests upsetting their plans and thwarting their efforts.

Co-ordination of Rail and Automotive Transportation*

BY JOHN A. RITCHIE

President Yellow Truck & Coach Manufacturing Company

TO MY mind the American Electric Railway Association convention in Atlantic City last October marked a milestone in the advance of co-ordinated electric railway and motor coach transportation. Not only the display of motor coaches at a convention of street railway operators, but more especially the thoughtful, intelligent consideration in a large number of papers on the problems of motor vehicle operation, gave overwhelming evidence of the realization of our common interest as transportation men.

With the adoption of the motor vehicle new problems have arisen, especially the best way to use the motor coach. That brings up the subject of co-ordination.

THE PUBLIC ITSELF IS A DICTATOR OF TRANSPORTATION

But who is to permit the co-ordination? We have a national dictator of transportation. He is not, however, an individual. This dictator is the public itself. But suppose we had a national officer called the "Dictator of Transportation." What would his first job be? Co-ordination.

He'd find that we have about 300,000 miles of steam and electric railroads, about 70,000 motor coaches, 3,000,000 motor trucks and about 17,000,000 passenger automobiles running over nearly 500,000 miles of improved highways and 2,400,000 miles of highways yet to be improved.

The transportation act of 1920 specifically recognizes this in its terms, something no preceding act had ever

done. In Section 15-a, the so-called rate-making section, it provides that the commission, bearing in mind the necessity of railroad growth, shall permit rates on which the railroads may earn a fair return on their fair value. I do not feel that this has been accomplished—and that is another story—but the will of the people, as expressed by Congress, is in the act.

As to the railroads, at least, it practically repealed the Sherman anti-trust act, and the vigorous sentiment in approval of railroad mergers which are in the public interest is evidence of how far we have traveled. The value of co-ordination in railroad service is now beginning to be appreciated.

The big idea in regulation used-to be restriction and preservation or incitement to competition, which often became competition of the cut-throat variety.

COURTS AND COMMISSIONS APPROVE THE IDEA OF CO-ORDINATION

Both courts and commissions have pointed out the value of co-ordinated service to the public. The Maine Public Service Commission, in refusing a certificate for a 955-mile independent motor coach system, said:

"We believe that the objective to be sought, in our state at least, is a co-ordination of public automobile service with that of the steam railroads and with such of the electric railways and street railways as will lend themselves to such co-ordinated service."

The courts have returned to the New Haven Railroad its trolley lines which were taken away in 1914 in an action under the Sherman anti-trust law. The New Haven based its appeal to the court on the fact that the Public Util-

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ities Commission of Connecticut had recommended to the General Assembly a co-ordinated service as in the public interest.

There was a time when such a judicial expression would have been practically impossible, and Judge Winslow's opinion is one of the highest significance.

You may be interested in some actual examples of co-ordinated operation. The largest in this country is that of the Public Service Railway Company of New Jersey with over 800 motor coaches. The policy of the company has resulted in more frequent service, cut down the number of bus-miles and car-miles operated and increased revenue on both cars and buses. Thomas N. McCarter, president of the corporation, in a letter to the stockholders said that "There can be no doubt that if co-ordination were brought about throughout the entire territory a great betterment in conditions would result."

In Philadelphia the Mitten Management was early in adopting the motor coach to relieve certain trolley lines and to feed others, as well as to meet competition from independent operators. It is now undertaking the taxicab business on a similar basis. In announcing its plan the management said:

"Co-ordination of transportation in big cities has been a steady onward march. It is inevitable. You can no more stop it than you can stop the law of gravitation."

In Providence, R. I., motor coach service was co-ordinated with the trolley by allowing the trolleys to run as expresses, with motor coaches taking care of the local passengers. This has gained much public good will and has resulted in increased net income.

The Pennsylvania-Ohio Electric Company operates an interurban motor coach service at Youngstown, Ohio, paralleling its own trolley car lines, but at a higher fare. This operation has proved both popular and successful.

The Colonial Coach Lines operate nearly 1,000 miles of intercity routes, chiefly in northern and western New York State, but extending into Pennsylvania and into Canada. Their rates are higher than railroad rates, but the operation is popular, successful and growing.

The Chicago, North Shore & Milwaukee Electric Line, operating between Chicago and Milwaukee, declares that through their more frequent and better service motor coaches have been directly instrumental in developing traffic where very little existed before. Furthermore, the operators say that the coaches have served as an advertisement for the company and in reaching out into the territory have secured many new patrons for their main line. Co-ordination is advancing with great strides.

Whereas in 1920 only sixteen electric railways were using motor coaches, 280 companies, according to the *ELECTRIC RAILWAY JOURNAL*, were using them in 1925, and 2,171 motor coaches were purchased by electric railway companies in 1925, more than twice as many as in the preceding year, which itself held the record. On Jan. 1, 1924, only 14 per cent of the electric rail-

ways operated motor coaches. In the following year this was increased to 19 per cent and last Jan. 1 the proportion was 35 per cent.

More than 13,000 miles of motor coach routes are now in operation by street railway companies, most of which is new service.

MASS TRANSPORTATION BY ELECTRIC CARS AND RAPID TRANSIT LINES

Electric cars or rapid transit trains probably will remain the chief vehicles in moving large crowds of people within rush-hour periods. Certainly they will so long as they can carry masses of people more cheaply, for there will always be people to whom the price of service is of more importance than the quality.

And while co-ordinated, each service should be permitted to retain its individuality. Then it will build up custom for itself.

There can be no doubt that existing companies are the ones to whom this job of co-ordination must fall. By virtue of training and experience in the art and science of transportation, electric railway managements, in most communities, are better prepared to operate motor coach lines than any organization without experience in transportation, a highly technical and difficult field. Transportation is both a science and an art and they have studied it all their lives.

Electric railways generally have important financial connections and resources which are necessary to assuring continuous motor coach service. This is a most important point—financial responsibility. Service by fly-by-night companies inexperienced in transportation, often formed only as stock selling propositions, can never render a continuous, dependable, comfortable and satisfactory service.

Nor should important rights be granted to applicants if they seek, with promises of lower rates, to get their heads under the tent and invade a field already occupied. Specific instances of this have lately arisen in Buffalo and in several applications for franchises in the city of New York.

Such reduced rate promises are specious, for they never can be more than temporary, and the ultimate cost to the public is greater.

Decisions of courts and commissions are full of recognition of these facts. For example, let us read from a decision by the Wisconsin commission in the LaCrosse Gas & Electric case:

"Rate wars usually mean for a time lower than paying rates, failure to keep plants in the best operating condition, and in the long run inadequate service.

"They often result in ruin of one or more of the plants concerned, crippling of the rest and in the ultimate consolidation of the remnants in one concern. "In the end customers will lose more through bad service than they have enjoyed through temporary low rates."

Just a word on another phase of co-ordination. It is time to get away from the word "monopoly." Co-ordination being new to so many may give an opportunity to the demagogue to arouse suspicion in the public mind by crying "monopoly." It is time we ceased using

certain words and phrases that hurt us with the public.

For the best reasons of public policy should transportation companies be allowed ample earnings, to provide not only for present good service, but that future growth which the country will need.

In establishing a co-ordinated electric railway and motor coach service there will arise one point which may become of serious importance and which must be placed effectively before regulatory bodies. Superseded physical property has a definite value represented by your securities and the co-ordinated service must produce sufficient net earnings to amortize over a term of years the physical value of the superseded property. To follow any other course would discourage new investment.

Public utilities as a group are never done growing, except in a dead community. And this means that a constant supply of new capital is just as necessary as a constant supply of new coal.

There is only one way in the world for you to get this capital from the investor. He has thousands of other ways to invest his capital and he is, therefore, the final dictator. Earning power with safety is all that attracts him, and any rate of return that fails to attract the investor in needed public utility service is a rate that is against the public interest.

In my judgment the earning power of the steam railroads as a whole has never, since effective regulation began, been anything like adequate, and even more, of recent years, have the electric railways suffered.

In the manufacturing field we permit any rate of return that the manufacturer's sagacity, foresight, skill and judgment enable him to earn, even though it be 25, 50 or 100 cent.

It is easy to see why the investor fails to be attracted by 6 per cent, or 7 or 8 per cent, as a maximum which may be earned by a transportation company which has no assurance even of that and must stand its own losses.

It is no crime to earn a net return. The net earnings of industry as a whole is the source from which all existing wealth, facilities and comfort of the world have come.

Had there never been any net return to industry mankind would still be running around naked, dwelling in caves, living on fish and native fruits.

Production and transportation are the nation's right and left arms. What shall it profit the nation if one be protected but the other be allowed to wither?

LIMITATION OF FAIR EARNINGS A FORM OF "PRICE FIXING"

In my humble opinion the limitation by law of profits honestly made has no place on statute books. I cannot see that, in principle, it differs from the policy of governmental price fixing for the products of any other industry. It is an attempt to overthrow the law of supply and demand, and history has yet to record any governmental effort in that direction which did not ultimately force somebody to pay a disastrous price.

Not only has your industry a right

to a good profit, but it is in the public interest that you should have it. No half bankrupt company can render good service. And your profits should be such as to enable you not only to serve the needs of the moment but to lead in new transportation development.

Next to providing transportation companies with adequate rates and

fares, public officials should reduce taxation on all forms of public transportation. Taxes add to the cost of service, and it is in the public interest to make the cost of transportation as low as it is reasonably possible. The one who uses a public utility service should pay for it rather than the taxpayer.

The Jolly Trolleying Public*

BY EDWARD F. WICKWIRE
Vice-President Ohio Brass Company

WHEN I was asked to give this little talk my first thought was respectfully to decline. I believe in the wisdom displayed by some of the so-called lower animals, such as the clam, for instance. The first thing the mother clam teaches her young is to keep its mouth shut.

However, having consented to violate the rules of the ancient and honorable order of clams, I was anxious to select a subject close to everybody—like underwear, for instance. But the program committee objected on the ground that in these winter days that subject is too rough, even for utility men. Finally we settled on the subject that is printed on the program, "The Jolly Trolleying Public." That was all right, because, like most people, I can discuss the other fellow's business better than I can talk about my own. Of course, anything that affects the electric railway industry has a direct influence on our ability to trot down to the corner grocery store on Saturday night and join in the groceryman's cash register chorus.

I am talking to you tonight not only from the standpoint of the 500,000 workmen who make electric railway supplies but also in behalf of the folks who are buying 43,000,000 electric railway rides in this country every day. How many of you have realized the fact that the electric railways of this country are furnishing 43,000,000 rides every day, and that the number is not decreasing, but steadily increasing.

When I speak of the jolly, trolleying public I am referring particularly to that part of the public which has for some years past, perhaps unthinkingly, been jolly trolleying the trolley out of existence in its conversation but still trolleying to the tune of something like 16,000,000,000 rides a year.

Try to imagine what would happen if we kicked the trolleys off the streets. If we substituted buses, that would mean something like two double-deck or three single-deck buses for every street car now in service.

If we think traffic is bad now, imagine what it would be if public transportation had to have double or three times the amount of street space during the rush hours. The buses would have to move so slowly that a tired snail with broken arches would outdistance them in half a block.

Replacing street cars with private cars would be worse. A friend of mine told me the other day he had driven his car 30,000 miles in one year—5,000

miles back and forth to work and 25,000 miles looking for a place to park.

As it is now, there is an automobile for every seven and a third persons in the United States. In other words, one out of every seven drives his own car. The fractions ride in ambulances. The remaining six evidently buy the 43,000,000 trolley rides every day, because very few of them feel able to walk.

I did hear of a Scotchman not long ago who walked 18 miles to see a football game, but he didn't gain anything, because when he got there he was too tired to climb the fence.

According to an accurate survey made here in New York, it takes seven times as much space to handle a passenger by taxi or private car as it does on a surface street car. If you include parked automobiles, it takes twenty times as much space per passenger. With these facts in mind, a man would have to be gifted with positively brilliant stupidity to claim that either the bus or the automobile could successfully take the place of the street car for mass transportation.

Russia has her Bolsheviks; we have our highly enthusiastic "Automotiviks," who advocate rubberizing all forms of American transportation, and who may, by some stretch of the imagination, have in mind stopping the production of pedestrians or perhaps producing a new race of tougher and more resilient pedestrians.

CAN DESTROY BUT NOT REPLACE

The danger lies in the fact that competitive motor transportation can destroy a transit system which it cannot replace. Fortunately, however, people are beginning to realize that the "automotivik," the man who says buses can entirely take the place of street cars, has too much tortoise shell on his glasses and not enough focus in the lenses.

The bus has its place in urban transportation—but it is not in the place of the street car. Ask the people of Saginaw, of Toledo, of Des Moines and of Akron—the Rubber City—who tried to put buses in the place of street cars. They were mighty glad to get the cars back. They had to lose them to appreciate them—as the flea said when he left his comfortable old home on a tramp for a position on a wealthy old skinkint.

A study made in St. Louis showed that while street cars carry about 90 per cent of the people using the streets, yet they cause only 10 per cent of the congestion.

Since it is a well-established fact, then, that the electric railway is indis-

pensable, the natural question is "What about the bus?" And the answer is, "Yes, there is a place for the bus." The next question that perhaps comes to mind is, "What relation is the bus to the trolley car, if any?"

Many of the early buses started at a time when electric railway expenses had increased enormously, while their rates of fare were held down to the starvation point. It was the zero hour in electric traction history and "wildcat" jitneys and "blunder" buses showed up, not to fill a need, but to grab a chance.

Like the sixth-class passenger on an ocean liner who went to the captain and said, "Can I have a berth to sleep in?" The captain asked, "Where have you been sleeping the past four nights?" And the passenger answered, "I was sleeping on a sick man, but he got well and won't stand for it any longer."

And so it is with the electric railway industry, it naturally objects to the bus living on it, but is actively carrying out plans for the bus to live with it.

Although electric railway men were not the first to operate buses, they seem to be the first and the only ones to endeavor to put in a complete, coordinated system which uses the buses as an addition to the existing transportation system, instead of a drain upon it.

Electric railway men who are experienced transportation specialists should be given an opportunity to work out the problem along sound, sane, economic, unexcited lines. The shrieks and tirades of the politician with a megaphone voice are no more useful than the whistle on a peanut stand. It makes a lot of noise, but doesn't roast any peanuts.

It is up to the people, who need the best possible transportation service, to discourage the type of public official who insists that the street car company shall pay for paving it doesn't use, pay big taxes, pay exorbitant damage claims, or, in a word, pay to feed and house the transportation cow, and then donate to the wildcat bus equal milking rights.

They have seized on the traction issue as a convenient vehicle for personal publicity. In one respect these politicians are like shoes—the cheaper ones squeak the loudest.

It is up to us to see that the bus isn't made to answer when the street car is called, but we do want the bus to take its place in the branches of transportation for which it is especially adapted.

For instance, the bus can provide a luxurious mode of conveyance, at a high rate of fare, to people who are willing to pay for that kind of service. Also, the bus has a very distinct mission supplying transportation in outlying sections of cities and in suburban communities not sufficiently populated to warrant expensive track extensions. Such service is usually not profitable in itself and the independent bus could not survive. But as auxiliary feeders to the trolley line, its use is justified.

The bus is also a good means of tying together various railway lines in cross-town or short-cut service, where the amount of traffic does not justify the heavy investment required for street car service.

*Abstract of address delivered at midwinter meeting of New York Electric Railway Association, New York, N. Y., Jan. 27, 1926.

Used in that way, the bus reduces still further the necessity for walking, and that seems to be the aim of most people nowadays.

The problem resolves itself, then, into a matter of constructive co-ordination, instead of destructive competition. This will be a distinct disappointment to people who think it is more fun to throw bricks than to lay them.

The keystone of a well-balanced transportation system, using street cars and buses—each in its proper place—is recognition of the undeniable fact that public transportation is a natural monopoly, especially since it is subject to the strictest kind of regulation—sometimes this regulation almost amounts to strangulation. Perhaps some of you have the thought in the back of your heads that competition is a good rule. Generally speaking it is. But there are exceptions to all rules, no matter how good. For instance, "start at the bottom" is a good rule to follow, but it's even advisable to make an exception to that rule when you're learning to swim.

The transportation companies which operated horse cars and cable cars in the old days discarded them when the electric car was developed. And they may discard the electric car in time, but not until the right substitute has been devised.

Meantime, the bus and the trolley car, both controlled and routed by one responsible transportation agency, are the best means yet discovered for providing quick, convenient and cheap transit for the majority of the people.

So why not let the electric railways, which are transportation specialties, work out the problem, not hampered by too many restrictions? Some legislators seem to jump out of bed every morning with an idea for a new law about traffic. For example, a bill was recently proposed in a Western state providing that night-driven herds of cattle on the highway must be equipped with tail lights.

I believe it would be better to enact a law compelling all pedestrians to be equipped with reflectors—red lights for females under 30, violet for grass widows and green for old maids. In that way a lonely motorist could tell at a glance whom to pick up and whom to run over.

As a closing thought I would like to say that while it is a good idea to give buses all the backing they deserve, it is certainly a mistake to let them run over the backbone of mass transportation—the electric street car.

I think I'd better quit right here, before you commence to think that I'm trying to imitate that famous Chinese orator "On Too Long."

Diversified Program at Louisville Meeting

Many Matters Discussed in Short Talks During One-Day Session of Kentucky Association of Public Utilities—Officers Were Elected and a Dinner-Dance Was Held

DISCUSSION of service matters, public relations, safety, advertising and publicity, co-operation between employer and employee and methods of improving the employee occupied an interesting one-day session of the Kentucky Association of Public Utilities, held at Louisville, Jan. 15. J. P. Barnes, president Louisville Railway, and president of the association, managed the program so that a large number of subjects were discussed and papers read during the short period of time available.

N. W. Funk, director of safety Louisville Railway, stated that in 1924 an economic loss of \$500,000,000 was caused over the United States by accidents, that 100,000 people were killed and a million others injured in avoidable accidents. He discussed the remarkable improvement in facilities for the pleasure and convenience of mankind over the last quarter of a century, which have, however, increased hazard and made safety work more important and necessary.

D. L. Gaskill, secretary-treasurer of the East Central Division, National Electric Light Association, Greenville, Ohio, discussed "Value of Associations to Utility Men," bringing out that through associations utility men have secured a much better grasp of conditions and interchanged information.

Harry Reid, president Interstate Public Service Company and president Kentucky Utilities Company, talked on the "Future of the States' Utilities." He

told of the formation of the association ten years ago with about eight present at a meeting at the office of the Louisville Railway, the small start growing into a large association and an organization for general good.

E. A. Jonas, editor-in-chief Louisville *Herald-Post*, delivered a humorous talk, on "What Is Power," referring to the power of the press, power of man, power of natural resources. George Colvin, superintendent Louisville & Jefferson County Children's Home, talked on "Public Utilities from the Citizens' Standpoint," holding that the industry was on the threshold of even bigger things than have been accomplished.

Labert St. Clair, director of publicity American Electric Railway Association, discussed "Don't Hesitate to Talk About Yourself." He argued for application of the golden rule, holding that it must be said, not sung from behind screens and frosted windows. He stated that today utilities were spending \$20,000,000 to \$25,000,000 annually on publicity and advertising and that it was doing a lot of good.

Dempster MacMurray, director of advertising and Publicity Middle West Utilities Company, Chicago, discussed "Relations of Public Utilities to the Press," in which he outlined the fact that the public had learned to depend upon the press for information concerning plans and policies of utilities and wanted the real information, not propaganda. He held that it was no place

for a press agent interpreter, as it was a question of what the public wants to know and what the utility must know regarding public thought.

At the afternoon session W. J. Horgan, consulting engineer, Louisville, discussed "Water Supply from the Standpoint of the Public Utility Company." Helen E. Steiner, director of public relations of the Ohio Public Service Company, made a few remarks regarding the co-operation of the women's committee in Kentucky and the excellent co-operation given by the utility executives in the state to the work of the women. She introduced Miss Isabelle Davie, secretary of the women's committee of the headquarters staff, N.E.L.A., New York City, who discussed "Women's Work in Public Utilities." N. M. Brigman, dean of the Scientific School, University of Louisville, discussed "Engineering Schools and Industry."

W. H. Hodge, manager advertising department, Byllesby Engineering & Management Corporation, Chicago, discussed "Customer Relations." He argued against suits against customers, for cutting red tape, quiet, sensible telephone operators, with pleasant voices and trained to their work, and a liberal policy, even if it meant smashing a lot of rules.

Dr. W. R. Jillson, State Geologist of Kentucky, in a talk on the "Natural Resources of Kentucky," said that state was on the threshold of a day in which public interest would turn to internal industrial development.

Officers were elected for the coming year as follows:

President—T. B. Wilson, vice-president and general manager Louisville Gas & Electric Company.

First Vice-President—H. J. Cochrane, president Maysville Public Service Company.

Second Vice-President—W. R. Power, general manager Ohio Valley Electric Railway.

Treasurer—A. A. Tuttle, treasurer Kentucky Utilities Company.

Secretary (re-elected)—E. P. Kelley, assistant to president Louisville Railway.

Executive Committee—J. P. Barnes, L. B. Herrington, W. H. Harton, J. P. Pope, P. S. Poge, H. D. Fitch.

About 150 utility men were present at the morning session and a slightly increased number at the afternoon session. On the evening of Jan. 14 there was a get-together dinner-dance in the crystal ballroom of the Brown Hotel at 7 o'clock. J. P. Barnes was toastmaster and welcomed the visitors. About three hundred attended the dinner-dance.

New England Street Railway Club

THE February meeting of the New England Street Railway Club will be held at Copley Plaza Hotel, Boston, Mass., on Thursday, Feb. 4, 1926.

There will be two sessions. The afternoon session will be called to order at 4 p.m. and will be devoted to three short papers on the subject of "Bus Maintenance." They will be presented by C. V. Wood, Jr., superintendent of bus division, United Electric Railways, Providence, R. I.; H. L. Sullivan, automotive engineer Eastern Massachusetts

Street Railway, and D. S. Mackay, supervisor of automotive equipment Boston Elevated Railway.

The evening session will be held in the Swiss Room of the Copley Plaza Hotel and the following papers will be read:

"Relation of the Bus to the Street Railway," by W. B. Spencer, assistant to president United Electric Railways, Providence, R. I.

"Buses as Used on the Boston Elevated Railway," by Edward Dana, general manager Boston Elevated Railway.

"How to Use Buses to the Best Advantage," by C. T. Seeley, vice-president Chicago Motor Coach Company, Chicago, Ill.

This is the last meeting before the annual meeting and banquet, which will be held on March 25, 1926.

New Officers for Engineering Council

AT THE annual meeting of the American Engineering Council, held in Washington, D. C., Jan. 13-15, Déan Dexter S. Kimball of Cornell University was elected president. The vice-presidents elected were: Gardner S. Williams, Ann Arbor, Mich.; O. H. Koch, Dallas, Tex.; I. E. Moulthrop, Boston, Mass., and A. W. Berresford, New York City.

Dr. H. E. Howe, Washington, D. C., was re-elected treasurer and Col. John H. Finney, Washington, chairman of the finance committee. L. W. Wallace was again elected executive secretary.

no definite procedure had been provided for submitting such standards to the membership for approval for inclusion in the Engineering Manual. After discussion Chairman Harte appointed the following sub-committee to study the entire matter of procedure: Charles R. Harte, chairman; R. H. Dalgleish, M. B. Rosevear and G. C. Hecker.

Chairman Harte transferred Mr. Dalgleish from the sub-committee on the program for equipment day at the convention to the sub-committee on the program for way and structures day.

The secretary read a letter from the American Society of Mechanical Engineers and the National Machine Tool Builders Association inviting the association to be represented on a sub-committee on standardization of tool holders and tool post openings. This project is a part of the work of the central committee on standardization of small tools and machine tool elements.

After discussion it was voted to inform the sponsor bodies that the association does not feel that its interests in the project are sufficient to warrant the appointment of a representative. It was decided also that the secretary should bring this project to the attention of the chairman of the equipment committee, requesting that he keep in touch with the movement as far as possible.

A letter from H. F. Brown, chairman of the committee on heavy electric traction, was read, suggesting that the publication of the Bibliography on Heavy Electric Traction might be financed by selling advertising to a selected list of manufacturers. Mr. Brown's feeling was that a number of the manufacturers were very much interested in having the Bibliography published. The executive committee felt that Mr. Brown's plan was worthy of serious consideration. It was voted to have Chairman Harte refer the matter to the committee on policy of the American Association.

A letter from James S. Mahan, Western Actuarial Bureau, was read, in which he pointed out that in the work of certain committees of the Engineering Association there would be an advantage in having someone familiar with fire insurance standards designated to work with these committees. After discussion Mr. Hecker was authorized to communicate further with Mr. Mahan and obtain any definite suggestions he had to make.

An invitation was received from the public utility group of the National Association of Purchasing Agents to send a representative to a conference which will be held in Schenectady on Jan. 28 and 29. The invitation had been referred to P. F. McCall, chairman of the committee on purchases and stores, who had arranged to send C. J. Swift, purchasing agent Chicago, North Shore & Milwaukee Railroad, to the conference.

A letter from the All-American Standards Council urging the association to support the pending metric standards bill (H. R. 10) was read and discussed. The secretary was instructed to acknowledge the letter and thank the All-American Standards Council for bringing the matter to its attention.

American Association News

Engineering Executive Committee Meets

Charles Rufus Harte Elected President, Succeeding Roy C. Cram, Who Tendered Resignation—Considerable Routine Business Transacted

ROY C. CRAM tendered his resignation as president of the Engineering Association in a letter dated Jan. 15. A special meeting was called for Jan. 23 to consider it. At this meeting, which was held at association headquarters, with First Vice-president Charles Rufus Harte in the chair, President Cram's letter of resignation was presented by Secretary Welsh. It is as follows:

January 15, 1926.

TO THE EXECUTIVE COMMITTEE,
AMERICAN ELECTRIC RAILWAY
ENGINEERING ASSOCIATION,
GENTLEMEN:

I have recently made a change in my company connections and find my duties there, combined with some matters of a personal interest, will require a great deal of my time.

I have found so far that the work involved in the office of president of the Engineering Association consumes a great deal of time and for the best interests of the association, as well as myself, I very reluctantly tender herewith my resignation as president of the American Electric Railway Engineering Association, which I hope will be accepted at your earliest convenience.

Thanking you for the splendid co-operation which I have had, I beg to remain,

Yours very truly,
(Signed) ROY C. CRAM.

The executive committee, on motion by Mr. Dalgleish, seconded by Mr. Graves, voted to accept with regret the resignation of Mr. Cram.

Acting Chairman Harte, asking Mr. Dalgleish to take the chair, offered the following resolution, to be spread upon the minutes and a copy transmitted to Mr. Cram:

Inasmuch as Mr. Roy C. Cram has changed his business connections, and having found his new duties require so much of his time that he feels he cannot properly attend both to this and to his duties as president of the American Electric Railway Engineering Association, he has accordingly tendered his resignation as president, to take effect at once; the executive committee of the Engineering Association, while greatly regretting the necessity for this action, can only accede to Mr. Cram's request.

From his first connection with the organization Mr. Cram has been an indefatigable worker, as an individual member of committees, as committee chairman, and in recent years as a member of the executive committee culminating in his election to the presidency of the Engineering Association.

Bringing to his work a never-failing enthusiasm and an untiring energy, Mr. Cram has materially advanced the work and the interests of the Engineering Association, and in accepting his resignation the executive committee hereby formally records its recognition and appreciation of Mr. Cram's services to the Engineering Association.

On motion by Mr. Harte, seconded by Mr. Durie, the resolution was unanimously adopted.

Mr. Harte then resumed the chair. On motion by Mr. Dalgleish, seconded by Mr. Miller, Mr. Harte was unanimously elected president to fill the unexpired portion of Mr. Cram's term. No action was taken to fill the vacancy existing on the executive committee.

ROUTINE BUSINESS TRANSACTED

Immediately following the adjournment of the special meeting a regular business meeting of the committee was called by the newly elected president, Mr. Harte.

The executive committee was advised of the approval by the way and structures committee of the simplified practice recommendation on shovels, scoops and spades. The executive committee voted unanimously in favor of indorsement by the association of this project.

Several matters in connection with the work of the American Engineering Standards Committee were considered. The question of the appointment of an alternate to Mr. Dalgleish on the main committee was discussed. The committee voted to authorize the president to appoint an alternate at the earliest possible moment.

The secretary announced that a final report on the design of plain girder rails for use in paved streets had been received from the sectional committee on special trackwork materials and plain girder rails. The committee on way and structures unanimously approved the report. The executive committee then approved the report and authorized its submission to the A.E.S.C. for approval as tentative American standard.

In referring to the procedure set up for handling the reports of sectional committees under the sponsorship of the association, it was pointed out that

Maintenance of Equipment

Spray Painting Used in Chicago

BY W. C. WHEELER
Equipment Engineer
Chicago Surface Lines

CARS are separated into three general classes for painting in the shops of the Chicago Surface Lines. In the first class are included new cars constructed and cars to be rebuilt. These naturally require the greatest amount of painting work. The second class includes cars in for overhauling and the third class cars which are to be repainted.

The preparation of the new car for painting begins very early in the

On the eighth day the paint is allowed to dry, followed by a coat of red color varnish and a second coat of cream color varnish on the ninth day. Lettering, numbering and decorating are done on the tenth day. On the eleventh, thirteenth and fifteenth days the first, second and third coats of body finishing varnish are applied. This allows the varnish to dry on the twelfth and fourteenth days.

Construction of the woodwork portion of the car body is carried on simultaneously with this painting program, so that the painting of the interior can be done at the same time as that of the exterior. Special pre-

torch and scraped. The steel panel cars are sandblasted clean. After this the treatment is practically the same as for a new car. This class also includes cars on which a great deal of new work is necessary during a general overhauling.

The third group of cars includes those which are still in good physical shape but which can be helped greatly in appearance by a coat of paint and varnish. These cars are washed thoroughly and any small scratches or breaks in the wood are primed, filled with putty and then the entire surface is given a coat of color varnish. After the lettering, striping and decorations are retouched the car is given one or two coats of finishing varnish as conditions require.

In order to reduce the time necessary for the car to be held out of service during the painting process, time-saving methods have been introduced from time to time. One of these is the use of the spray gun to paint the roofs, trucks and under parts of car bodies. The lettering, numbering and decorating of the car, with the exception of the striping, are done with decalomania transfers, which permit a great saving of time over the old method of hand work.



Applying a Coat of Paint to the Roof



Spraying the Car Body

assembly of the body, for all metal parts are given a coat of red lead wherever they come in contact with other metal. After assembling the frame and before any woodwork is placed thereon the entire surface for exterior painting is sandblasted so that it is clean and in proper condition to receive the coat of priming paint. After this is applied, the car is allowed to stand for at least one day before a coat of process No. 2 is applied.

On the fourth day a coat of thin putty, or what is known as knifing compound, is applied to give a smooth surface. The fifth day the surface is sanded with linseed oil and benzine, and a second coat of process No. 2 is applied on the sixth day. The seventh day the surface is smoothed with dry sandpaper and one coat of red ground color is applied to those parts of the body that are painted red and a coat of cream ground color is applied to the rest.

cautions are taken to see that the interior receives a very fine finish, as well as one that prevents deterioration due to improper protection. The floor is painted underneath as it is being laid and then it receives three coats of paint after it is in place, the last coat being a varnish color. Forty-eight hours are allowed to elapse between coats, so that the paint may dry thoroughly. All interior woodwork is oiled with boiled linseed oil and stained to a uniform color, after which it receives two coats of varnish and is rubbed down to a dull, smooth finish. The roof boards are painted with one coat of paint and the canvass is applied while the paint is wet. The roof is then given two coats of paint.

The second class of cars includes those whose condition is such that the old paint must be entirely removed and a new surface prepared. Cars with wooden panels have the old paint burned off with a gasoline

Steel I-Beam Under Joints in Concrete Paved Track

SPECIAL concrete construction has been adopted for car tracks in Augusta, Ga., regardless of the type of street pavement. The construction used at joints to prevent depressing of the tracks under passing cars and so produce strains in the paving, which might result in cracks, is told in the *Concrete Highway Magazine* for November, 1925. A steel I-beam is welded under each rail joint and a 3-ft. x 3-ft. concrete block, 19 in. thick, is cast under the beam for a foundation. This construction provides a rigid track which is not depressed by passing cars and in which the rails, ties and adjacent pavement all work together to support the load.

Concrete paved streets vary in

width from 24 ft. to 50 ft., exclusive of the car tracks. Transverse expansion joints are installed at intervals of from 40 to 75 ft., depending upon the distance between street intersections. A 2-in. board is used as the expansion material. This board is cut to the exact cross-section of the street and, until the concrete is

filled with 1:1½:3 concrete. This makes a rigid concrete construction and the steel beam to support the joint has proved of particular benefit. The electric railway company prepares the track and the city pays for the paving.

Calorizer Equipment for Shop Furnaces

EFFICIENCY in the Cold Spring forge shop of the Milwaukee Electric Railway & Light Company has been improved considerably by equipping the fuel-oil-fired heating and annealing furnaces with calorizers. The accompanying illustration shows one of the furnaces in operation with the calorizer equipment.

The calorizer is shown at the right-hand side of the furnace and consists of a box-shaped attachment with an atomizer and gasification and combustion chambers. The small pipe from below leading to the calorizer feeds the fuel oil from the large storage tanks, while the large pipe over the furnace to the calorizer delivers the low-pressure air required. This air is supplied from a direct-connected motor-driven blower mounted to the left of the furnace.

In the calorizer the fuel oil is atomized and intimately mixed with air and so serves the furnace in a similar manner as the carburetor serves a gasoline engine. Provision

is made for quick gasification, followed by the addition of the exact amount of air to insure the most perfect combustion possible. Low-pressure air at from 8 to 12 oz. per square inch is used for both atomization and combustion.

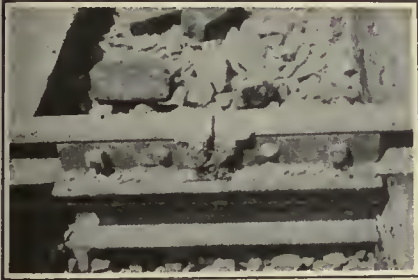
The temperature and composition of the gases in the calorizer-equipped furnace are under the control of the operator and any conditions desired can readily and easily be secured and maintained. There is also a more even distribution of heat throughout the furnace and very little if any gases or smoke are emitted. This gives more satisfactory working conditions. Increased production results from the time saved from bringing the furnace up to proper heating temperature by properly controlling the temperature and by improved distribution. These economies have more than justified the change from the old style oil burner to the calorizer for the oil-fired furnaces.

Redwood Blocks Make Durable Shop Flooring

FOUR-INCH blocks cut from new redwood ties were used recently for a wood-block flooring for the machine shops of the Los Angeles (Cal.) Railway. This made a cheap, durable flooring, easily constructed by unskilled labor, which is giving satisfactory service.

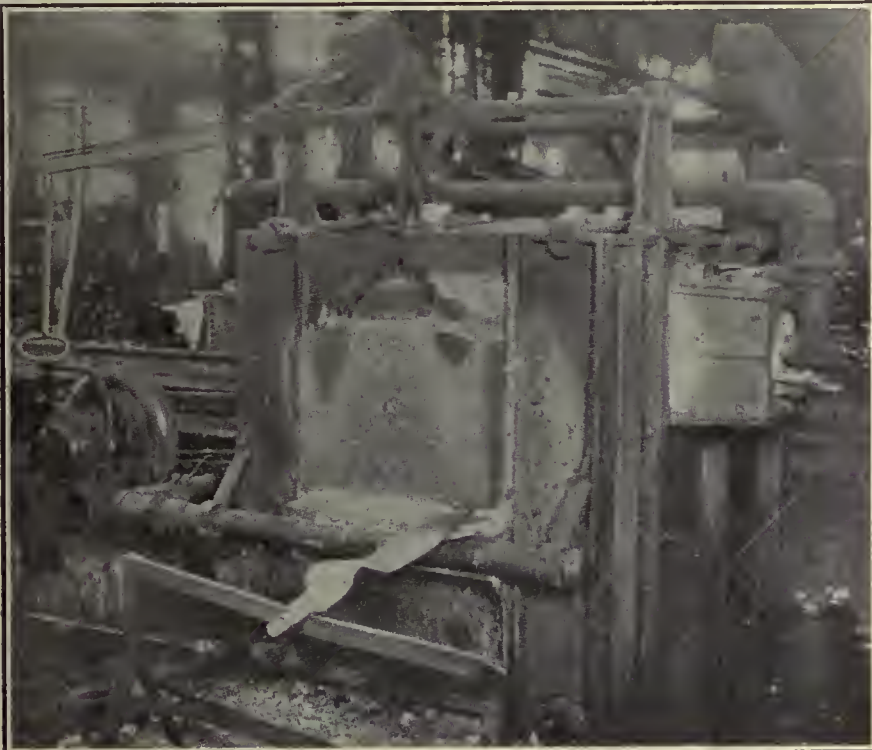
The ties, each 6 in. x 8 in. x 6 ft., were first surfaced on four sides to insure uniformity. After the blocks were cut they were creosoted and placed on end, ¼ in. apart. The sub-base was then graded and rolled and any depressions were filled with dirt and rerolled to insure a firm foundation. Grade stakes were set about 10 ft. apart and a base of 5-in. concrete was poured, care being taken to surface this as level and smooth as possible. This was necessitated by the fact that no sand cushion was used. The blocks were placed directly on the concrete base, which was first thinly surfaced with hot asphalt, and they were set into the asphalt while it was still liquid. By hitting the block with a wooden mallet, it was found to stick to the asphalt and was thus held in position until the entire floor was laid.

A ½-in. x 1-in. x 1-in. angle iron 6 ft. long, on which two small handles had been welded, was placed over the first row of blocks along the wall at one edge of the area to be

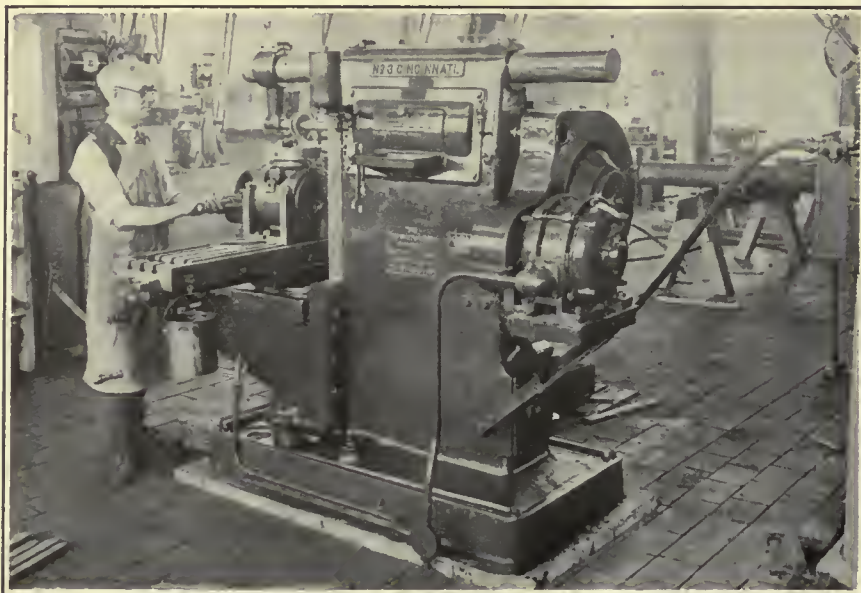


A Steel I-Beam Supported on a Concrete Pier Is Welded Under Each Rail Joint in Concrete Paved Track in Augusta

placed above it, is held accurately at right angles to the pavement surface by stakes. When the top of the board has been worn off by traffic, the joint is filled in with bituminous material. The street railway company's charter provides that the city must maintain all paved car-track areas. Driveways on either side of the track are paved to within 18 in. of the rail. After this pavement has hardened sufficiently to permit working on it the car-track area is paved. The space between the bottom of the ties and the top of the rail is



Calorizer-Equipped Furnace in the Cold Spring Forge Shop of the Milwaukee Electric Railway & Light Company



Wood-Block Flooring in the Shops of the Los Angeles Railway

laid. The next row was then placed snugly against it, securing alignment of each succeeding row. Several piles of loose sand were dumped on the surface after all blocks had been

placed and this fine sand was swept into the cracks between blocks. Oil from various machines eventually saturated this sand, holding the blocks firmly in place.

New Equipment Available

All-Metal Car Doors

MANUFACTURED from a new aluminum casting alloy, a new design of door for electric cars has been patented and put on the market by Lightalloys, Ltd., London, England. The alloy used for the construction of these doors is a binary

one, containing 86.5 per cent of aluminum and 13.5 per cent of silicon. These materials are subjected to a special refining and modifying process in the foundry. The treatment changes the original properties of the alloys and produces a fine grain material having great strength, ductility and toughness. The tensile strength under test amounts to approximately 13 tons per square inch with an elongation in 2 in. of 7 per cent.

Advantages of this type of door over built-up wooden construction are that the metal door is more rigid and there is no tendency to warp when exposed to bad weather conditions. The design of the metal door provides a wide extension at the lower end, and when mounted as a sliding door in electric car service danger from jamming or tilting is reduced.

The mounting for sliding consists of two ball bearing wheels, the inner race being stationary and held in position by three rivets which pass through two steel plates into recesses in the main casting. The outer race, which is free to rotate, is formed with a groove and runs on a rail fixed to the floor of the car. The



Aluminum Sliding Doors for Electric Car Service

top guide is of extruded manganese bronze. A flexible edging is provided which consists of rubber, vulcanized onto patent leather. This is fixed firmly to the front edge of the door by means of aluminum binding strips. A long strip of rubber fastened on the back of the door acts as a dust excluder when the door is closed. The slot for housing the roller guide used in mechanical opening and closing of the door is lined and faced with bronze. A small plough is fastened to the bottom front end of the door to keep the sliding rail slots clean.

Safety Guard on Lamp

CONSTRUCTED to withstand the severe service encountered in electric railway shops, a hand lamp with strong safety guard has been brought out by the Crouse-Hinds Company, Syracuse, N. Y. The guard and half shade are made of special aluminum alloy, which is light in weight but very strong and tough. The hook at the end of the guard is large and strong and is swiveled so that when half a shade is used the light can be directed as



Construction of Safety Hand Lamp. At Left, Guard Closed; at Right, Guard Open

desired. A compression washer prevents a twisted lamp cord.

The handle is of seasoned maple, black enameled, and contains the lamp socket and a strain release cord clamp. The socket is of weather-proof type and is made of heat-resisting, molded, insulating material. The guard may be opened by a few turns of a wing nut which holds the parts together at the top. The hinged side of the guard swings back and gives free access to the lamp. There are no detachable parts which might be lost easily.

The News of the Industry

Franchise Committee Appointed in St. Louis

Mayor Victor J. Miller of St. Louis, Mo., has appointed a special committee to draft an ordinance embodying a franchise for the St. Louis Public Service Company, which has been organized to take over the properties of the United Railways. When the ordinance draft is completed Mayor Miller will invoke the initiative provisions of the city charter to submit it to a vote of the people for ratification. The committee will be composed of the Board of Public Service, the Comptroller, the President of the Board of Aldermen, the City Counselor, the committee on public utilities of the Board of Aldermen and the Mayor.

The action of Mayor Miller assumes that the receivership of the United Railways will be lifted at an early date. It is probable that on Feb. 15 Federal Judge Faris will conclude the litigation involving the affairs of the company, join all the issues and order a sale of the properties of the company under foreclosure.

An amendment to the public service commission act passed by the Missouri Legislature of 1925 provides the manner in which a service-at-cost system may be put into effect. The amendment was passed at the instance of the reorganization committee of the United Railways. It defines and provides the service-at-cost arrangement.

It is believed that the basis for the new franchise will be the finding of a transit survey by the St. Louis City Plan Commission made in 1920. This will be revised and brought up to date. It is also believed that the new measure will provide specifically for co-ordination of street car and bus. Mayor Miller favors that plan.

The 1920 survey report provided for eight main arteries of traffic from the down-town district, all other streets being left clear for vehicular travel. It also provided for the rerouting of various lines. It covered 370 miles of track and 70 per cent of the city's area. It was based on the assumption that a quarter mile walk to a street car is "easy walking distance," and on that theory recommended the elimination of 65 miles of street car tracks by shortening and straightening existing car lines.

The City Plan Commission recommended against the establishment of a rapid transit system. It contended that the volume of traffic in any one direction was not sufficient to warrant the outlay.

In recent months the city, through a special committee of the Board of Aldermen, has made a special rapid transit survey. This report is now in preparation. C. E. Smith, consulting

engineer for the Department of Public Utilities, who is in charge of the details of this survey, favors the creation of a rapid transit system, including subways in the down-town district.

Fare Question Up at Louisville

The question of whether the Louisville Railway, Louisville, Ky., will get an increase in fare from 7 cents cash, with a 6-cent ticket fare, to a straight 7-cent fare was expected to come close to settlement at a meeting scheduled

for Jan. 26, at which officials of the railway were to meet members of the Board of Works. The railway's statement for the twelve months ended Dec. 31, 1925, shows that the barometer fund is under the \$200,000 limit, at which, under existing agreement with the city, the fare would increase automatically on Feb. 1.

It is understood that members of the Board of Works conferred a few days ago with the City Attorney and officials of the Public Utilities Bureau about the railway's statement.

Railway and Bus on Super-Highway

Elaborate Program of Detroit United Contemplates Use of New Light-weight Cars and Double-Deck Buses—\$1,000,000 Program for Detroit-Pontiac Line

A. L. DRUM, executive manager for the receivers of the Detroit United Railway, has outlined contemplated improvements in the D. U. R. service between Detroit and Pontiac and cited reasons for the company's contention that it should have control of the transportation on Woodward Avenue, where the Detroit Motor Bus Company has also petitioned the Public Utilities Commission of Michigan for permission to operate. It was intended to hold the hearing in Lansing on Jan. 26.

It is pointed out by Mr. Drum that in the development of the super-highway between Detroit and Pontiac the Detroit United Railway has co-operated to the utmost with state authorities during the past construction season and it is the earnest desire of the receivers to continue that co-operation. The state's plan for this wider Woodward Avenue involved relocating the railway's tracks in the center of the highway. The company owned certain tracts of land and private rights-of-way, but it joined in the Governor's program. The work done so far, together with that to be accomplished this year, involves the company in an expenditure of more than \$300,000 for track and overhead.

Fully appreciating the rapid development of this section of the territory served by the company, a construction program has been started as part of which the company is now receiving ten of the most modern light-weight cars particularly adapted for this service.

The D. U. R. will shortly start a limited service every hour on the hour between Detroit and Pontiac. Stops will be made only at the principal cities and important intermediate points. When the line is functioning as anticipated, new and additional outlay on this division for cars, tracks, terminal stations and buses will be more than \$1,000,000.

As soon as the double tracking is complete and the road brought to grade

throughout, waiting rooms and shelter stations will be provided and well-lighted passenger platforms for the rail passengers will be placed within the curb line out of the way of general vehicular traffic.

Mr. Drum expects that the new electric car and bus passenger terminal station at Highland Park, opposite the Ford plant, will become one of the busiest passenger stations of its kind in the United States. It is expected that very heavy short line electric rail and bus service will be operated from this Highland Park terminal station northerly over Woodward Avenue to the several cities and communities along the route, so as properly to fit the carrying capacity and routes of electric car and bus service to the volume of the traffic between Highland Park and Pontiac and the intermediate cities and communities.

It is pointed out that to supplement the rail service the receivers recently purchased the Star Motor Coach line, operating in this territory, to the end that rail and coach service may be properly co-ordinated and properly administered.

The management of the D. U. R. is rapidly organizing and improving bus operation between Detroit and Pontiac. It proposes to add new and improved motor coaches to this service as rapidly as possible. The existing equipment is being overhauled and newly painted. Application has recently been made to the Michigan Public Utilities Commission for authority to try out a special short line service from the Highland Park terminal to Ferndale, Pleasant Ridge and Royal Oak. Double-deck motor coaches seating 60 passengers will be run. It is the expectation to operate many double-deck coaches on the Woodward Avenue super-highway from Highland Park to Royal Oak, Birmingham and Pontiac to serve the peak loads of traffic to and from the industrial plants. These vehicles will be

especially advantageous in serving the large volume of excursion and sight-seeing traffic that will be attracted to the Woodward Avenue super-highway during the spring, summer and fall.

Mr. Drum further points out that unified operation will unquestionably produce greater benefits to the people than can any competitive operation, particularly where there is such absolute control by the authorities as in Michigan. According to Mr. Drum anything less than unified operation will have an ill effect upon the people through eventual poorer service or higher fares, or both.

Seek Better Service in Nashville

Conferences between engineers of the Nashville Railway & Light Company, Nashville, Tenn., and the Railroad and Public Utilities Commission will be held in an effort to work out some plan to relieve traffic conditions in the downtown section of the city. This decision was the result of a hearing before the commission. The company announced it welcomed suggestions about its service.

Interstate Sunday Passes Added at Wheeling

Following expiration of the formal 30-day notice required by the Interstate Commerce Commission, the Wheeling Traction Company, Wheeling, W. Va., added a series of interstate Sunday-holiday passes as of Jan. 24. The new passes are: "Ohio," from Wheeling to Martin's Ferry, Lansing and Bellaire, 25 cents; "Ohio-Greater Wheeling," from the continuous community Warwood-Wheeling-Benwood to Martin's Ferry, Lansing and Shadyside, 50 cents; "Ohio Terminals," from Wheeling to ends of lines at Rayland, Barton and Shadyside, and "Windsor," from Windsor to Steubenville, 50 cents. The Wellsburg-Weirton 50-cent pass and the "Universal" \$1 pass were liberalized to take in Steubenville and all Ohio routes respectively. The Steubenville-Brilliant (Ohio only) 25-cent pass was added Jan. 1, following the West Virginia passes inaugurated Dec. 25. A novel feature in the sale of this pass is that tickets are accepted in payment, owing to the fact that most regular riders are supplied with strip tickets and are therefore less inclined to lay out additional cash.

Messrs. Stotesbury and Mitten Settle Differences

The following announcement was issued on Jan. 27 by the Philadelphia Rapid Transit Company:

Through the good offices of General Atterbury, the unfortunate misunderstanding which has existed between Messrs. Drexel & Company and the P. R. T. management has been completely removed.

Mr. Stotesbury and Mr. Mitten met in General Atterbury's office just before Mr. Stotesbury left for the South and agreed to work together in harmony for the advancement of the city.

E. T. Stotesbury is head of the banking house of Drexel & Company. Thomas E. Mitten is chairman of the executive committee of the P. R. T. and president of Mitten Management, Inc. General W. W. Atterbury is president of the Pennsylvania Railroad.

Christmas "Lucky Bags" Sold at Baltimore

Street car fare tokens as appropriate Christmas presents attracted considerable attention in Baltimore when the United Railways offered them as a solution to the "what to give" problem. Shortly before Christmas the company publicly announced "Lucky Bags" of car checks as useful and economical Christmas gifts.

The "Lucky Bags" consisted of a small green bag tied with red ribbon and sealed with red wax. Each bore a gift card with the following:

In wishing you the best of luck
Upon this Christmas Day
I'm sending you these tokens,
Which will help you on your way.

Each "Lucky Bag" contained thirteen tokens, each good for one fare on the cars of the United. The bags were sold at 98 cents each. The fare is 7½ cents, when tokens are used, and the United pointed out that the additional half cent helped to defray the cost of the bag, ribbon, seal, card, etc. The company stressed the fact that the "Lucky Bags" made acceptable gifts for "friends, relatives, the office boy, the stenographer, the cook, the maid, the elevator boy, the ice man, the coal man, the janitor, your Uncle Bim—in fact, everybody."

The "Lucky Bags" were sold at the offices of the United and at a large number of stores, banks and other places in all parts of the city.

"Use the Car" Campaign in Birmingham

The Birmingham Electric Company, Birmingham, Ala., owner of the electric railway system at Birmingham, is conducting a campaign to induce the public to use the street cars more and

The parking problem in the downtown section is a matter that is giving the city officials serious concern. The Birmingham Electric Company is taking advantage of the situation and is advising the public to ride the street cars as a means of solving the parking question.

New York-New Jersey Loop Line Suggested for Commuters

Speedy construction of an interstate rapid transit loop, 17 miles in length with tunnels under the Hudson River at the Battery and West 57th Street, New York, has been recommended by the North Jersey Transit Commission in its report submitted to the Legislature by Gov. A. Harry Moore. The cost of constructing the loop, which would consist of a subway in Manhattan and elevated or depressed tracks on the New Jersey side, was estimated at \$154,000,000, with \$40,000,000 additional for equipment.

Governor Moore said:

Having in mind that it will take probably from eight to ten years after actual construction has been commenced to complete an adequate transportation system, and that suburban terminals are now practically at the saturation point, it is obvious that the solution of this problem may not longer be delayed.

Governor Moore recommended that the commission not only be continued with a proper appropriation but that it receive broader powers of negotiation, such as would be necessary with the authorities of New York State and New York City, if the plan was to be carried out.

A bill designed to establish the commission as a statutory body, instead of one depending upon each Legislature for continuance, has been introduced by Senator Mackay of Bergen County. This bill authorizes the appointment by the Governor of a commission of seven members.

The recommendation for the construction of an interstate loop was only one of many by the commission for the relief of congestion in the so-called "inner ring" of New Jersey, consisting of Hudson, Essex, Bergen and Passaic Counties, within a radius of 20 miles from the City Hall in New York. This territory, the report said, has an area of 706 square miles, a population of 1,951,000 and tax ratables of \$3,122,000,000.

Limited Cars for Rush-Hour Service

The New York State Railways notified the Public Service Commission on Jan. 20 that it would put into effect the commission's suggestions for limited cars for through service from Utica to Clinton between 4.30 and 5.30 each afternoon. The limited cars will leave Utica at 4.30, 5 and 5.30 p.m. The purpose of the through cars is to meet the objections of patrons of the Clinton-Waterville bus line that Clinton cars were crowded each night during the rush hour with Utica city passengers. The company also notified the commission that it had instructed its operators to delay the departure of cars from Clinton when buses of the Barber company are in sight in order to accommodate passengers going to Utica.

You Are Wasting



Time and Money

If You Don't Use the Street Cars

In going to and from the congested business area

"Save the Difference"



The Message of the Birmingham Company

the automobile less for business purposes. Attractive display advertisements are appearing in the Birmingham newspapers.

Contract Signed in Chautauqua —Students Will Have Service

The Board of Education of Chautauqua, N. Y., has signed the guarantee agreement with the Chautauqua Traction Company which provides for the operation of one passenger car for the purpose of transporting school children and for such additional cars as may seem wise. This is the result of negotiations between representatives of the Chautauqua Board of Education and officials of the traction company, following the petition of the company for permission to abandon service between Ashville and Mayville. It was said at the time the proposed agreement was under consideration that it would not involve a withdrawal of the petition pending before the Public Service Commission for consent to abandon the line between Ashville and Mayville.

It is the intention of the agreement which the parties that are concerned now proposed entering into to maintain the most economical schedule possible. The agreement also provides that the school district will pay all deficit in actual operating expenses to the end that the Chautauqua Traction will not suffer any direct loss from such operation. This payment does not include any salaries for general offices, charges for depreciation, interest on investments or the funded or unfunded debts of the company, or any allowance or sums for accidents. The agreement will continue in force from month to month until canceled by one or the other party by ten days written notice. The present agreement is effective for 30 days from Jan. 11.

Reference to the proposed abandonment of the Mayville line was made in the *ELECTRIC RAILWAY JOURNAL*, issue of Dec. 19, 1925, p. 1094. At the hearing in Buffalo on Jan. 4 before the Public Service Commission George R. Raynor, principal of the Chautauqua High School, testified that there was 10.8 miles of the 13.4 that was proposed to be abandoned in the school district. He pleaded for a continuation of a service upon which 144 students were solely dependent. Later negotiations looking toward limited service were started.

Fare Agreement in Spokane

New fares of 10 cents cash with five tickets for 35 cents were granted to the Spokane United Railways, Spokane, Wash., by the Department of Public Works of Washington at Olympia on Jan. 23, two days after a formal hearing at Olympia, where officials of the city of Spokane protested the increase. School tickets will remain at 50 for \$2. Transfers will remain free, but the age limit of children carried free is raised from four to five years. The new fare schedule will become effective on Feb. 1. It will replace a 7-cent cash fare with five tickets for 30 cents.

Fare discussion has been going on in Spokane since last October, when the company filed notice of increased rates. The company first sought a 10-cent cash rate with a ticket fare of thirteen for \$1. An agreement between the management of the railways

and the city resulted in a modification of this petition with the filing of a 10-cent cash fare and a 7-cent ticket rate.

Zone Changes in Columbia

Consolidation of Nos. 1 and 3 fare zones of the Columbia Railway, Gas & Electric Company, Columbia, S. C., into a single zone is provided in an order recently issued by the South Carolina Railroad Commission. The order also extends the northern limits of Zone 1 by approximately eight blocks. The change was effective Jan. 10.

The fare zone system, designed by the Railroad Commission to increase if possible the company's revenues, was started on Dec. 16, but, according to reports recently made public, failed to produce the results desired. As was told in the *ELECTRIC RAILWAY JOURNAL*, issue of Dec. 26, 1925, page 1125, the commission divided the system into five zones with a 5-cent fare in each zone. The old fare had been 7 cents with 3 cents additional for transfers.

Fewer Accidents in Los Angeles

On the lines of the Los Angeles Railway, Los Angeles, Cal., there were 3,050 fewer accidents in 1925 than in 1924 although more miles of street car service were operated. In 1925 there were 20,244 accidents, against 23,294 the previous year. According to *Two Bells*, the official paper of the Los Angeles Railway, the improvement was consistent throughout the year. Most of the accidents were caused by collisions of automobiles and street cars. There were 15,118 such accidents in 1925, compared with 16,799 in 1924. A reduction in collisions with pedestrians from 514 in 1924 to 325 in 1925 is attributed to the restriction of jay-walking in the downtown district.

News Notes

New Paper to Tell of Memphis Doings.—Tri-Service News is the name of a new paper that has just been issued by the Memphis Power & Light Company and the Memphis Street Railway of Memphis, Tenn. It is a monthly and will deal primarily with the problems of the employees. The first issue carries a review of the development by the two companies during the past year and a statement of the program for 1926. Paul Renshaw, advertising manager of the companies, is editor.

Pass System Continued.—The Tacoma Railway & Power Company, Tacoma, Wash., has again been given an extension of its permit to continue the weekly pass system at \$1.25 a week, the permit covering the quarter ended April 25. Although the company has had the pass system in use for nearly four years, a portion of which time the passes sold for \$1 each, it has operated the system as a temporary proposition on quarterly permits from the State Department.

Philadelphia Will Not Appeal Decision.—The decision of the Public Service Commission in upholding the Philadelphia Rapid Transit Company's

petition for maintenance of the 7½-cent fare rate will not be appealed by the city. Mayor Kendrick of Philadelphia, Pa., made this fact known on Jan. 20. The Mayor defined the city's attitude shortly before he left City Hall with Charles B. Hall, president of the Council, and City Solicitor Gaffney to attend a Sesqui-Centennial meeting. Mr. Gaffney would not express any opinion until he had looked over the ruling.

Election on Public Utility Control.—The East St. Louis, Ill., City Council on Jan. 18 passed a resolution instructing the city counselor to circulate petitions for an election to determine whether the public utilities within the municipality should be placed under control of the city. A state statute provides for the assumption of such control by referendum vote. The action is being taken, the resolution states, as the result of numerous complaints made to the City Commission of unfavorable decisions by the State Commerce Commission.

Referendum on Purchase Legal.—A referendum on the proposal of the City Council of Seattle, Wash., to purchase the Seattle & Rainier Valley Railway is legal, according to a ruling of Corporation Counsel T. J. L. Kennedy. The question had been raised as to whether the residents of the entire city could sign petitions for a referendum vote on the purchase of the valley line. Mr. Kennedy said there was no such thing as a "regional referendum," claimed by some in favor of the purchase, who held that only the people of the valley were entitled to participate in a referendum. The railway purchase is being held up by a referendum petition being checked by Harry W. Carroll, City Comptroller.

Railway Needs Help.—At a meeting of the directors of the Chamber of Commerce at Owensboro, Ky., a committee was named to take steps to aid the Owensboro City Railroad. G. M. Millican, general manager, in a communication, reported that despite rigid economy, the company continued to lose money. The system has been in the hands of W. A. Carson, Evansville, as receiver since 1923. A saving has resulted, Mr. Millican reported, as a result of the city municipal plant supplying current for the operation of the cars. A 7-cent fare is charged.

May Operate Mozart Line.—The Wheeling Traction Company, Wheeling, W. Va., has been asked to take over the City Railway line in Wheeling to Mozart Hill, an agreement to that effect having been discussed at a meeting of the joint Council, a citizens' committee and officials of the traction company on Jan. 20. The Wheeling Traction Company stated it would consider the offer recently made by the committee provided the latter reconsiders the present traction franchises. Under the terms of the offer made by the city, the Wheeling Traction Company could operate the line for a period of three months and if during that time the service proves unprofitable the line could be returned to the city. If possible an appointed committee will effect a plan whereby all lines of the Wheeling Traction Company in the city of Wheeling can be operated under one franchise.

Recent Bus Developments

Discussion of Bus Renewed in Buffalo

H. H. Melville, president of the American National Omnibus Corporation, New York City, has assured Mayor Schwab and the City Council at Buffalo, N. Y., that the company will appear before the Public Service Commission at an early date to urge its case for the right to operate 5-cent bus lines in Buffalo. The company already has its franchise from the city for operating thirteen routes over 71.5 miles of streets.

He explained in a letter to municipal authorities that it was found that the manufacturing and financial capacity of the Gray Manufacturing Company, Detroit, was not equal to the requirements of the large amount of business under negotiation and accordingly new arrangements were made which has resulted in the organization of the American Bus & Truck Company, Inc. The assets of this company are more than \$3,500,000, of which \$900,000 is cash working capital, and which has no liabilities of any kind except its capital stock. This company is now completely organized and the plant at Springfield, Ohio, formerly owned by the Kelly-Springfield Truck Company, has been purchased and is in possession of the new company. In this connection it was necessary for the American National Omnibus Corporation to transfer its American rights in the Tilling-Stevens United States patents. This transfer was made in London last month and Ernest M. Howe, Detroit, who secured the Buffalo bus franchise, will return from England within a very short time with all details completed.

Associates in the new bus enterprise in Buffalo are William Schall of Schall & Company, New York; Gerard P. Tameling, Tameling, Keen & Company; Frank Hagemeyer and Charles P. Norcross, vice-president of O. J. Gude, outdoor advertisers.

There is much opposition to the institution of a 5-cent bus service in Buffalo by outside capitalists. The Buffalo Chamber of Commerce believes the move is made to discredit the International Railway Company and its subsidiary, the International Bus Corporation, which now operates three lines in the city. N. Loring Danforth, president of the Buffalo Chamber of Commerce, has sent a letter to the municipal authorities saying the new bus interests should show their good faith by filing their financing plan at once with the commission and take steps to bring about an early hearing on their application for a certificate of convenience and necessity from the state utilities board.

Withdraws Request for Bus Extension.—Withdrawal of its request for permission to operate buses as an extension of its car service along Summit View Road, between Walker Avenue inside the city limits of Yakima, Wash.,

to Englewood Avenue outside the city, has been filed by the Yakima Valley Transportation Company with the Department of Public Works. The withdrawal has been allowed.

El Paso Supplies Rail-Bus Service to Lower Rio Grande Valley

An extensive rail-bus service to Clint, Ysleta, Fabens, Tornillo and other points in the Lower Rio Grande Valley, south and east from El Paso, Tex., is being supplied by the El Paso Electric Company. The combined service extends 45 miles east of El Paso. The interurban cars of the company run as far as Ascarate, which is 6 miles out of El Paso. At this point the transfer is made by passengers under a covered depot to the valley buses, incoming passengers to change at this station from the buses to the interurban cars and continue on into El Paso. The present interurban tracks from Ascarate to Ysleta, a distance of 7 miles, will be abandoned. It is said this will not occasion any inconvenience to former interurban passengers between these points as the bus service from Ascarate eastward is along a concrete highway which parallels the interurban.

The interurban cars in this service are painted a bright green with red roof and sash. The buses in this service are Reo, 20-passenger intercity type, with front entrance and exit door. They are painted gray with blue stripings and on the side of the buses are the words "Lower Valley King Cotton Express." The combined interurban and bus service started on Nov. 19, 1925, and it is believed will solve successfully the problem of adequate transportation service in the lower Rio Grande Valley.

In addition to its interurban service the company in December, 1925, passed an ordinance to supplement its railway service within the city of El Paso with buses.

South Bend Company Seeks Three-Cents-a-Mile Bus Fare

The Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., has petitioned the Public Service Commission of Indiana for an increase of $\frac{1}{2}$ cent a mile in the basic rate of fares on the intercity buses. Fares on bus lines within the city of South Bend would not be affected. The intercity buses operate between South Bend and the Indiana Michigan state line and from South Bend to Goshen, through Mishawaka, Elkhart and to Laporte. The company cites figures showing that between Oct. 10 and Dec. 31, 1925, a loss of \$7,228 was incurred as a result of the present rate of $2\frac{1}{2}$ cents.

Since October, 1925, the basic rate per mile as approved by the Public Service Commission has been $2\frac{1}{2}$ cents, with a 25 per cent reduction for commutation tickets. All passengers paid

per mile. The present petition would establish 5-cent zones for short hauls, with a minimum fare of 10 cents. Under the proposed plan twelve commutation tickets would be sold for \$1 and a \$5 coupon book for \$3.75.

The petition states that if a safe, efficient and dependable service is to be given and taxes paid an increase in the basic rate of fare, must be allowed. Officials of the company claim that the $\frac{1}{2}$ -cent per mile increase sought would be sufficient to care for both operating expenses and returns on the investment. The rate war which was conducted between competing companies is generally blamed for the fact that revenues failed to meet expenses. This dissension some months ago caused several smaller bus companies to go out of business, but the Jahns bus lines and the interurban company made an agreement whereby part of the service offered by each was rearranged.

New Line Lowers School Fare.—The Public Service Commission has approved as of Jan. 18 the establishment of a new bus line by the Utica Railway Co-ordinated Bus Line, Inc., beginning at Genesee Street and Main Street, in Utica, and extending to Clark Mills. Fares for pupils attending day schools are 10 cents where regular fare is 15 cents or 20 cents; 15 cents where regular fare is 25 cents or 30 cents; 20 cents where regular fare is 35 cents. Minimum fare between any two stops is 10 cents.

Permission to Run Buses.—The Council of Salamanca, N. Y., has granted the Olean, Bradford & Salamanca Bus Lines, a subsidiary of the Olean, Bradford & Salamanca Railway, a franchise to run between Salamanca and Little Valley and the Allegany State Park.

Buses May Supplant Four-Mile Line.—The Denver & South Platte Railway, operating between Englewood and Littleton, Col., a distance of about 4 miles, has organized the Denver & South Platte Transportation Company as its subsidiary. The subsidiary specifies buses, and if it can get a permit for the buses and permission to substitute them for the tramway operation of the railway will be abandoned. Travel over the line is light. Connection is made by the Denver Tramway at Englewood.

Service in Portland Extended.—The Portland Electric Power Company has added another bus line to its supplementary service in Portland, Ore. This is to be known as the Powell Valley Road line and will operate in the vicinity of Powell Valley Road over East 82d Street to Kendall station.

Will Supplement Rail Service with Bus.—The Asheville Power & Light Company, Asheville, N. C., will supplement its railway service between West Asheville and the main business district of the city with two eighteen-passenger buses on a fifteen-minute schedule. The fare will be 10 cents with no transfer privileges. The company for some time past has been maintaining a bus service to the end of the street car line in West Asheville, carrying passengers as far as the entrance to Sulphur Springs on a half-hour schedule. The new service is expected to be of benefit to the West Asheville residents.

Financial and Corporate

Radial Troubles Explained

Toronto Paper Resents Statements
Made in Recent Issue of
"Tulley Talks"

As the *Toronto Daily Star* sees it, the two greatest problems which Toronto faces to-day are the deficits on its harbor and the deficits on its radial railways. That authority says the annual deficit on the radials is due chiefly to an obvious and curable cause—their operation as isolated units by a commission which has nothing whatever to do with the city system in which they would naturally center. The *Star* says that if the radials had been operated in 1924 at T. T. C. costs there would have been a saving of \$255,000 to offset the reported deficit of \$248,000. It was on the basis of such facts that Mr. Cameron sought election to the mayoralty on a straight platform of T. T. C. operation. The *Star* said that a vote for Cameron as Mayor and for Gibbons, McBride, Whetter and Robbins as controllers was a vote to stop the radial deficits by giving the radials to the T. T. C. to operate.

Incidentally, that paper was led into a general discussion of the whole matter as a result of a quotation in the *ELECTRIC RAILWAY JOURNAL* from a recent issue of "Tulley Talks," published by Mitten Management, Inc., at Buffalo. The statement by Mr. Tulley said:

Toronto, under municipal operation, concerning which much has been said as to the kind of service and the cheapness of the fare, is also proving a disappointment in that the taxpayers are already being called upon to pay large sums of money to make up for the losses sustained in carrying the people at less than actual cost.

The fact is that outside the city Toronto owns the York radials. These lines are operated for Toronto by the provincial Hydro commission at an annual loss to the taxpayers of nearly \$250,000. Inside the city Toronto owns the whole street railway system. It is operated for Toronto by the Toronto Transportation Commission without the loss of a dollar to the taxpayers. The *Star* says that in efficiency of service and in financial soundness it is a splendid advertisement for public ownership, but that the advertisement is marred by the failure of the radials. Here's how the *Star* explains the matter:

The losses made by the radials under provincial Hydro management are attributed to the city system under T.T.C. management. It is an unwarranted reflection on the T.T.C., which has never yet operated at a loss. But if the garbled statement is a reflection on the T.T.C., the truth is a reflection on the Hydro, and public ownership again suffers. It suffers unnecessarily. For the deficits arise from an unnecessary condition. No management could make the three radials pay when they are separated from the city system and from each other, with consequent quadruplication of equipment, barns, yards and shops, and absence of a "through" service to the center of the city. But by giving the radials to the T.T.C. to operate, all these disadvantages disappear, and the deficits disappear with them.

Operation of the Toronto-owned radials by the Toronto Transportation Commission will therefore have the following beneficial effects:

1. It will take a burden of \$250,000 a year off the shoulders of the Toronto taxpayers.
2. It will relieve the Hydro of the discredit of operating radials at a loss.
3. It will relieve public ownership of this reproach. In fact, it will strengthen public ownership. For the T.T.C. will wipe out the deficits.
4. It will give radial users and radial express a "through" service to and from the center of Toronto, and Toronto and the surrounding country will profit by the trade thus developed.
5. The T.T.C. will profit by the rentals charged the radials for use of tracks, barns, etc., within the city, while the radials will profit by paying only once for these, instead of paying for duplicated and triplicated facilities.

San Francisco Municipal Loss \$305,162

For Year Ended June 30, 1925, the Excess of Income Over Operating Expenses, Interest, Depreciation and Accident Reserves Was \$6,385, but Taxes and Similar Charges Amounted to \$311,548

TOTAL revenue of the Municipal Railway, San Francisco, Cal., for the year ended June 30, 1925, was \$3,281,498. Interest on securities owned increased this by \$44,595, to \$3,326,093. Deducting operating expenses of \$2,544,720 left net of \$781,372. Against this \$186,678 was charged for interest on funded debt and \$588,308 for reserve for depreciation and for accidents, leaving a balance of \$6,385, compared with \$8,374 for the previous year.

For the purpose of securing a comparison between the results of operation of the municipally owned utility and similar utilities operated by pri-

Sale of Ohio Properties Approved

Sale of the properties of the Cincinnati & Dayton Traction Company, including the main line from Cincinnati to Dayton and the Hamilton city lines, now in the hands of George P. Sohngen, receiver, has been approved by the Court of Appeals at Hamilton, Ohio. The receiver has been ordered by the court to pay all claims against the company so as to facilitate the sale. The receiver holds cash and securities amounting to \$777,067.

A reorganization plan has been approved and adopted by the protective committee representing the holders of the first and consolidated mortgage 5 per cent bonds of the Southern Ohio Traction Company and the holders of the first 6's of the Cincinnati & Hamilton Street Railway, included in the Cincinnati & Dayton system.

vate capital, the charter of the city and county of San Francisco provides that the operating reports shall include certain comparison charges consisting of items which constitute part of the actual cost of operating privately owned companies, but which the municipally owned utility is not required to pay. For the year these charges amount to \$311,548, leaving a net loss of \$305,162. This compares with a similar deficit of \$295,230 for the previous year.

There has been a continuing deficit, as shown by the cumulative income account for the period from Dec. 28, 1912, to June 30, 1925, amounting to

COMPARATIVE INCOME ACCOUNT, SAN FRANCISCO MUNICIPAL RAILWAY

	—Year Ended June 30—		Dec. 28, 1912
	1924	1925	to June 30, 1925
Passenger revenue.....	\$3,173,181	\$3,268,383	\$28,683,573
Miscellaneous revenue.....	16,352	13,115	123 470
Total revenue.....	\$3,189,533	\$3,281,498	\$28,807,043
Interest on securities owned.....	46,519	44,595	361,269
Total income.....	\$3,236,052	\$3,326,093	\$29,168,313
Operating expenses:			
Way and structures.....	\$115,467	\$115,073	\$914,993
Equipment.....	187,635	197,619	1,693,105
Power.....	465,889	464,990	3,834 695
Conducting transportation.....	1,523,269	1,600,499	12,600,619
Traffic.....	109		3,836
General and miscellaneous.....	167,910	166,333	1,130,702
Loss on road retired.....			8,184
Total operating expenses.....	\$2,460,282	\$2,544,515	\$20,186 138
Other deductions:			
Taxes—Motor bus.....		205	205
Total operating expenses.....	\$2,460,282	\$2,544,720	\$20,186,343
Excess of income over operating expense.....	\$775,770	\$781,372	\$8,981,969
Less: Interest on funded debt.....	196,223	186,678	2,561,640
Excess of income over operating expenses and interest.....	\$579,546	\$594,694	\$6,420,328
Less: Reserve for depreciation and accidents (18 per cent of gross earnings).....	571,172	588,308	5,162,145
Excess of income over operating expenses, interest, depreciation and accident reserves.....	\$8,374	\$6,385	\$1,258,183
Less: Charter comparison charges.....	303,604	311,548	2,587,732
Net loss.....	\$295,230	\$305,162	\$1,329,548
Analysis of Comparison Charges:			
*State franchise tax—4½ per cent of gross earnings.....	\$167,442	\$172,279	\$1,510,832
†Municipal franchise tax—3 per cent of gross earnings.....	126,927	130,735	954,893
Municipal car license.....	3,135	3,135	33,393
Federal income tax.....			13,270
Salary of clerks.....			4,872
Law expenses.....			13,500
Insurance.....	6,099	5,398	56,969
Total.....	\$303,604	\$311,548	\$2,587,732

*State franchise tax percentage has varied in different years. to 4 per cent. *Italics* indicate loss or deficiency.

†Municipal franchise tax now increased

STATISTICAL DATA, SAN FRANCISCO MUNICIPAL RAILWAY, FISCAL YEAR ENDED
JUNE 30, 1925

	Total Amount	Per Car-Mile	Per Car-Hour
Total passenger revenue.....	\$3,268,383.23	\$0.3673	\$3.5477
Total operating expense (taxes and depreciation not included)...	2,544,515.59	0.2860	2.7619
Total operating earnings (taxes and depreciation not included)	723,867.64	0.0813	0.7858
Ratio of earnings to passenger revenue.....	0.2215		
Total taxes and charter charges.....	311,753.11	0.0350	0.3384
Ratio to passenger revenue.....	0.0954		
* Depreciation.....	588,308.97	0.0661	0.6386
Ratio to passenger revenue.....	0.1800		
Operating expenses, depreciation and taxes.....	3,444,577.67	0.3871	3.7389
Ratio to passenger revenue.....	1.0539		
Net deficit from operation.....	176,194.44	0.0198	0.1912
Ratio to passenger revenue.....	0.0539		
† Passenger car mileage.....	8,897,271		
‡ Passenger car-hours.....	921,280		
Platform expense (67½ cents per hour; time and one-half for over-time after eight hours, and after ten hours range; time and one-half for seventh day work; twelve days vacation per year with pay). Bus operators, 72½ cents per hour; same conditions as platform men.....	1,332,652.65		
Number of passenger cars owned.....	209	Free passengers (employees, etc.).....	618,830
Number of work cars owned.....	6	Total passengers carried.....	79,900,645
Total number of cars owned.....	215	Number of passengers carried per car-mile	8.98
Total number of buses owned.....	10		
Total number of cars and buses owned.....	225		
Passengers carried—5-cent fares.....	64,783,403		
5-cent fares—Government tickets.....	43,952		
2½-cent fares—School tickets.....	1,009,735		
2½-cent revenue transfers.....	302,016		
Free transfers.....	13,142,709		

\$1,329,548 when the comparison charges are included. Omitting these from consideration, there has been an excess of income over operating expenses, interest, depreciation and accident reserves of \$1,258,183.

As in previous reports, particular attention is given to the explanation of the items in the balance sheet, which is reproduced in condensed form herewith. Capital assets consist of road and equipment, \$7,992,410, and general expenditures, \$324,872. Thus the total cost of road and equipment was placed at \$8,317,283. Current assets consist of \$943,517 of securities bought for the depreciation fund, \$15,185 in accounts receivable and \$153,523 for materials and supplies. The item of deferred assets, some \$132,123, did not change during the year. Thus the total of assets was \$10,595,543. On the liability side the funded debt item represents the par value of bonds outstanding in the hands of the public on June 30, 1925. Current liabilities include accounts and vouchers payable, \$339,763, and interest due on funded debt, \$44,231. The reserves include a reserve for depreciation of \$1,373,288 and a reserve for compensation insurance of \$102,855.

The Municipal Railway has no capital stock and the excess of its assets over its liabilities represent surplus. In a

preparation of a balance sheet this surplus has been divided into two classes: First, that which was created by donations or contributions, and, second, that which has accumulated from the earnings resulting from the operation of the road. The contributed surplus includes premiums from the sale of bonds, \$26,000, and contributions from general taxes, \$306,552. In surplus from income is included \$1,791,000, representing the income which has actually been set aside for the redemption of bonds. Of this amount the item of \$1,690,000 rep-

COMPARATIVE CONDENSED GENERAL
BALANCE SHEET, SAN FRANCISCO
MUNICIPAL RAILWAY, AS OF JUNE 30, 1925

Assets	1925	1924	Increase or Decrease
Capital assets.....	\$8,317,283	\$7,912,526	\$404,756
Current assets.....	2,146,137	2,174,925	28,788
Deferred assets.....	132,124	132,124	
Total assets.....	\$10,595,544	\$10,219,576	\$375,968
Liabilities, Reserves and Surplus:			
Funded debt.....	\$3,791,000	\$3,992,000	\$201,000
Current liabilities.....	383,996	269,720	114,275
Reserves.....	1,476,144	1,568,470	92,326
Contributed surplus.....	332,553	332,553	
Surplus from income.....	4,611,852	4,056,833	555,019
Total surplus.....	\$4,944,405	\$4,389,386	\$555,019
Total liabilities, reserves and surplus.....	\$10,595,544	\$10,219,576	\$375,968

Italics indicate loss or deficiency.

STATEMENT OF BUS LINE OPERATIONS,
SAN FRANCISCO MUNICIPAL RAILWAY,
YEAR ENDED JUNE 30, 1925

Revenues:	
Passenger earnings.....	\$40,765
Q. M. tickets.....	6
School tickets.....	771
Local transfers.....	13,628
Total revenues.....	\$55,172
Operating expenses:	
Repairs to buses.....	\$9,385
Tire expense.....	8,236
Garage expense.....	18,155
Conductors and chauffeurs.....	27,742
Depreciation (18 per cent of receipts).....	7,337
Compensation insurance.....	1,097
Motor bus tax.....	205
Total operating expenses.....	72,160
Net loss for year.....	\$16,987
Average net loss per day.....	46.54

resents bonds redeemed and canceled and the item of \$101,000 was cash.

An item of considerable interest to railway operators is the charter reserve of \$1,119,471 for insurance and taxes. As explained previously, there are set aside certain sums for comparison with private operation, of which this item is a part. The municipal system not having to pay any of these charges, the receipts from operations were deposited in the operating cash fund without any restrictions as to how they were to be used. As a matter of fact, most of the cash in the operating fund, represented by such comparison charges, was actually expended in new construction and

addition and betterment work, so that these reserves representing obligatory comparison charges have in reality been used as reserves for betterments. For the purpose of making the balance sheet reflect the actual results of operations, the amount expended in addition and betterment work has been reflected in an account entitled "Additions and Betterments from Income," and the charter reserves for insurance and taxes carry a balance equal only to the unused portion of the original reserves.

The amount included in the additions and betterment account is \$2,651,573. This account represents the value of construction and addition and betterment work performed out of the funds derived from the operation of the road.

Operating surplus of the San Francisco Municipal Railway is made up as:

Operating surplus.....	\$1,052,316
The following is an analysis of the above figure:	
Surplus June 30, 1924.....	\$768,481
Add: Transfers from depreciation fund to operating fund to cover deficits in the latter.....	74,093
	\$842,574
Deduct: Amount transferred from income account.....	\$694,398
Interest on securities credited to income but deposited in depreciation fund.....	44,595
Internal revenue tax on motor buses for hire for years 1920 to 1924.....	820
Adjustment—Replacing cable in Twin Peaks Tunnel.....	7,351
	357,929
Total.....	\$1,052,316
Total surplus from income.....	\$4,611,851
The total surplus derived from the operations of the road is as follows:	
Bonds retired through income.....	\$1,690,000
Reserve for bond redemption.....	101,000
Advance general fund—Twin Peaks Tunnel.....	82,152
Advance general fund—Stockton Street Tunnel.....	48,971
Advance general fund—Ocean Shore Railroad switching.....	1,000
Charter reserves.....	1,119,471
Additions and betterments from income.....	2,621,573
Operating surplus.....	1,052,316
Total.....	\$4,611,851

The net loss on bus operation was \$16,987, compared with \$19,861 for the previous year. These figures, however, do not include any supervision or other overhead or comparison charges.

The total single track mileage as of June 30, 1925, was 69.40. The total bus route mileage as of that date was 5.42.

Indianapolis Property Reported in New Insull Deal

Announcement was made at Chicago on Jan. 27 of an impending deal which will bring under Insull control the Terre Haute, Indianapolis & Eastern Traction Company, including the Indianapolis Street Railway. These properties will be merged with the Central Indiana Power Company. Mr. Insull was reported to have said that the interests he represented were not going into the consolidation primarily from the traction point of view, but that with their traction lines in northern Indiana and the Interstate Public Service Company's line from Indianapolis to Louisville closer traction relations were certain, with through interurban service possible from Chicago to Louisville.

Atlanta Company in Southeastern System

Individual shareholders owning substantially more than a majority of the total outstanding common capital stock of the Georgia Railway & Power Company, Atlanta, Ga., have agreed to accept in exchange therefor 1,633 shares of cumulative participating preferred stock and one share of non-par value common stock of the Southeastern Power & Light Company for each share of Georgia Railway & Power Company common stock owned by them. When completed this exchange will bring under centralized, unified and co-ordinated ownership and management the Alabama Power Company (a subsidiary of Southeastern Power & Light Company) and the Georgia Railway & Power Company.

The Alabama Power Company and Georgia Railway & Power Company will continue as individual operating companies, with their own organizations and management, under the local state laws, maintaining their own financial structures and subject to public regulations as to rates and security issues within the respective states served. The present policies and management of the Georgia Railway & Power Company will continue. No change in the organization personnel is contemplated.

The agreement reached will make possible more effective and continuous use of present operating water power and steam plants, and will result in future co-operative development of water power in the various water sheds of Georgia and Alabama.

In addition auxiliary steam power generated to the extent necessary at the mouth of the Alabama coal mines will be connected by wire with and made available throughout the territory served, a condition of great economic and industrial advantage.

Milwaukee Company Calls 8 per Cent Issue

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has called for payment on March 1 the \$3,000,000 of 8 per cent preferred stock sold by it locally to its customers in 1921. Holders have the option of turning in the stock on March 1, on which date the dividend is payable, and receiving their principal and a bonus of \$3 a share or of receiving in lieu of the 8 per cent stock a similar amount of the company's 7 per cent issue. It would appear from the terms of the offer of exchange that an additional amount of the 7 per cent stock is shortly to be issued.

The company will reduce its funded debt by \$6,500,000 on Feb. 1 by the payment of its consolidated first mortgage bonds due on that date. This maturity will be met without the issuance of any new bonds. The cash required will be provided by the issuance and sale of \$3,750,000 additional common stock and by local sales of preferred stock, and, to such extent as may be necessary, by cash advances by the parent North American Company. Upon the retirement of this issue, only

about 57 per cent of the company's total capitalization will be represented by mortgage bonds and the value of the company's property will be more than double the amount of all mortgage bonds outstanding.

Interurban Offers a \$5,000,000 Issue

Changes in the financial structure of the Chicago, Aurora & Elgin Railroad, Aurora, Ill., were made public on Jan. 27 with the announcement of an offering by Halsey, Stuart & Company, Inc., of an issue of \$5,000,000 first and re-funding mortgage 6 per cent bonds, at 96 and interest, yielding more than 6.30 per cent. Part of the proceeds will be used to refund the \$750,000 of 6½ per cent notes due next December, the \$1,050,000 bonds due in 1947, and also for the purchase of approximately \$2,000,000 of first mortgage 5 per cent bonds due in 1941. This will place the company in an unusually strong position.

As part of the plan the Chicago, Aurora & Elgin Railroad will be incorporated in Illinois as successor by consolidation to the present company of the same name. The company will own 103 miles of line, measured as single track. For the twelve months period ended Nov. 30, 1925, gross revenue of the company was \$2,699,900. Net earnings during the same period before depreciation were \$665,734, as compared with the annual interest of \$310,150 on the company's funded debt to be outstanding in the hands of the public upon completion of this financing.

Protective Committees for Chicago Street Railways

Plans are fast being perfected to protect the holders of securities of companies embraced in the system of the Chicago Surface Lines. Early in February Leonard A. Busby, president of the Chicago City Railway, stated before the City Council transportation committee that protective committees of security holders were being formed. Now Frank O. Wetmore, chairman of the board of the First National Bank, bankers for the South Side lines, says that the personnel of the committees will be made known soon. It is known that four committees are being organized, of which the two principal committees will be these:

First—For the protection of \$60,000,000 underlying bonds of the Chicago Railways Company; chairman, A. W. Harris, Harris Trust Company.

Second—For the protection of the \$40,000,000 underlying bonds of the Chicago City Railway and the Calumet & Southern; chairman, Frank O. Wetmore, First National Bank.

A third committee will protect the junior securities of the Chicago City & Connecting Railways; chairman B. E. Sunny.

That leaves one committee to be formed—the committee to protect the securities of the West Side properties.

Prior to the consolidation of the properties in 1907 the Chicago City Railway had no bonded indebtedness, and the only securities outstanding were \$18,000,000 in stock. Of this amount the Morgan house bought shares having a par value of \$17,000,000.

\$457,109 Surplus for Interborough for Six Months

For the six months ended Dec. 31, 1925, the total revenue of the Interborough Rapid Transit Company, New York, N. Y., from all sources was \$30,167,690, an increase of \$1,614,977 over the corresponding period of 1924. This increase is largely accounted for by the receipt in July, 1925, of a cash payment of \$770,000 as part consideration for the new advertising contract, which became effective Nov. 1, 1925. There was no similar payment in the previous year. Operating expenses, taxes and rentals paid to the city for the old subway increased \$766,855. Income deductions increased \$142,496. The net result for the six months was a surplus of \$457,109. This represented an improvement of \$705,625 compared with the corresponding period of 1924, due chiefly to the new advertising contract.

Conestoga Traction Properties in Deal

Purchase of control of the Lancaster County Railway & Light Company, Lancaster, Pa., and of the Harrisburg Electric Light Company, Harrisburg, Pa., is announced by the Lehigh Power Securities Company. Included in the deal are 162 miles of electric railway operated by the Conestoga Traction Company, the common stock of which is owned by the Lancaster County Railway & Light Company.

The Lehigh Power Securities Corporation has sold to bankers an issue of \$25,000,000 of 6 per cent gold debentures, series A, due Feb. 1, 2026, the proceeds to be used to retire \$7,566,000 outstanding Lehigh Power ten-year 6 per cent secured gold notes, to finance the purchase of the new properties and other purposes. The United Gas & Electric Corporation is to receive for the Lancaster and Harrisburg properties Lehigh Power's present outstanding issue of \$13,000,000 of \$6 cumulative preferred \$100 par stock and about \$10,000,000 in cash.

After disposal of the properties the United Gas & Electric Corporation is to be absorbed by the Empire Power Corporation.

Preliminary Figures at Grand Rapids

E. J. Bechtel, New York, was elected a director and a vice-president of the Grand Rapids Railway, Grand Rapids, Mich., at the annual meeting on Jan. 26. Other directors and officers were re-elected. The annual report, as furnished the city, showed total earnings for 1925, including miscellaneous items, of \$1,738,779 a decrease of \$32,553 compared with total receipts for 1924. Operating expenses were \$1,172,157, an increase of \$72,982 compared with 1924 and largely due to rental of cars by the company because of stock destroyed in the fire at the Hall Street carhouse and to high maintenance charges.

Arrival of 27 new cars about April 1 is expected to improve the situation. The number of revenue passengers carried during 1925 was 23,947,305 or a decrease of 877,713 compared with 1924.

Personal Items

F. J. Linforth Promoted

Superintendent of Employment at San Francisco Made Assistant to General Manager

Frank J. Linforth, superintendent of employment and training of the Market Street Railway, San Francisco, Cal., has been appointed assistant to M. McCants, general manager of that company.

Much of the success of the company's personnel policy is attributed to Mr. Linforth's close application to the solution of this problem. Each section of the country has problems that are largely its own in this matter, but so far as the Market Street Railway is concerned it has succeeded in cutting down labor turnover materially. The complete picture in figures cannot be



F. J. Linforth

given here, but since Mr. Linforth became inspector of applicants in 1910 more than 18,000 men have passed through his hands, so to speak. For the last three years all the men hired have taken a training course. Perhaps still more to the point in some respects is the fact that at the start of the new system of training in 1923 the probationer's examination was taken voluntarily by all motormen and conductors.

But there is another angle to the matter. Mr. Linforth has edited the company's magazine, the *Inside Track*, since its inception in March, 1922. He will continue in his capacity of editor. This is good news for the men and women of the company, for he has made the *Inside Track* one of the very best of its kind. That publication is edited in a way that indicates keen insight on the part of the editor into the needs of the men and women of the system, shows rare good taste and reflects a humanitarianism based on wide contact with men and events over a long period of years.

Mr. Linforth entered the employ of the Market Street Railway as a conductor in September, 1908. In June, 1910, he was detailed to the Turk and Fillmore office as night clerk and was in succession day clerk, investigator and

inspector of applicants in the employment department. In July, 1923, he was appointed superintendent of employment and training.

Before going to the Market Street Railway he had been a captain of constabulary in the Philippine Islands. He went to the Philippines as a volunteer during the Spanish-American War. He was educated at Notre Dame University.

J. P. Dick and C. E. Bennett Promoted in Atlanta

Jackson P. Dick, formerly assistant to the vice-president and general manager of the Georgia Railway & Power Company, Atlanta, Ga., has been promoted to assistant general manager.

Mr. Dick has been with the Georgia Railway & Power Company since 1919 as purchasing agent for the department of development and shortly thereafter was made purchasing agent for the entire company. In July, 1924, he was promoted to assistant to the vice-president and general manager. This position he has held up to Jan. 1, 1926, when he was made assistant general manager. Mr. Dick was graduated from the University of Georgia in 1908. At one time he was connected with the Texas Company.

C. E. Bennett, electrical engineer, has been appointed manager of the company's electrical department.

G. S. Davison New President of A.S.C.E.

George S. Davison has been elected president of the American Society of Civil Engineers for the year 1926. He is well known in electric railway and in rapid transit circles. Back in 1897 Mr. Davison became chief engineer of the Monongahela Street Railway System, which operated 70 miles of track in Pittsburgh and neighboring communities. He built the Pittsburgh & Charleroi Street Railway. In 1901 he became the general manager and director of the Pittsburgh & Birmingham Traction Company, serving the section of Pittsburgh south of the Monongahela River. In 1905 and 1906 he directed the construction of the Allegheny Valley Street Railway from Aspinwall along the Allegheny River to Natrona. In a consulting capacity he investigated and reported upon many interurban street railways for financial purposes.

Mr. Davison was born in the Lawrenceville section of the city of Pittsburgh in 1856. He was graduated from the Rensselaer Polytechnic Institute at Troy, N. Y., in 1878, with the degree of civil engineer. At the present time he is a member of the Planning Commission of the city of Pittsburgh and chairman of the Transit Commission of the city of Pittsburgh. He has been a member of the American Society of Civil Engineers since 1890. He served it as a director and vice-president previous to his election as president.

W. C. Campbell in New Post

Duties of Tennessee Official Widened and More Closely Defined—Man of Wide Experience

W. C. Campbell, formerly assistant to B. C. Edgar, new president of the Tennessee Electric Power Company and the Nashville Railway & Light Company, was placed in charge of all operations in the communities outside of Chattanooga and Nashville, effective Jan. 1. The position is a new one and comes as a result of the continual expansion of the company's business throughout middle and eastern Tennessee.

The new executive has been associated with various branches of the public utility business for the past 25 years. Early in his career he served a year and a half in the test department of the General Electric Company at Schenectady, and was sent by this concern to New York City to supervise the installation of car equipment for the New York subways. With the ex-



W. C. Campbell

ception of one year spent as general carhouse foreman of the New York Railways, he remained in New York City with the General Electric Company until 1909, going from there to the Pacific Coast for construction, engineering and sales work.

In 1914 he left the General Electric Company and returned East to become assistant general superintendent of the Columbus Railway, Power & Light Company, Columbus, Ohio. He became general superintendent in 1918. It is at this point that Mr. Campbell recalls to mind the Campbell-Clapp combination. H. W. Clapp, another engineer executive, was promoted to the general managership of the Columbus property at the time that Mr. Campbell succeeded to the post of general superintendent, previously occupied by Mr. Clapp. The careers of both men were reviewed in the *ELECTRIC RAILWAY JOURNAL* of Dec. 28, 1918. It was said at that time that both Mr. Campbell and Mr. Clapp would retain their interest in electrical engineering matters. It was also said that their experience demonstrated that engineering training need not prove a bar to general administrative work if a man has a talent for such.

One year later Mr. Campbell went to Chattanooga, Tenn., as assistant to B. C.

Edgar, then vice-president and general manager. He has had charge of all rate matters for the company, insurance and other duties, which he will continue to supervise.

Mr. Campbell is a native of Kentucky. He was graduated from Union College, Schenectady, N. Y., in 1900 and took an additional year of engineering at Purdue University.

P. R. T. Real Estate Manager to Retire

J. A. Patterson, for many years real estate representative of Mitten Management and of the Philadelphia Rapid Transit Company, Philadelphia, Pa., will retire from active service July 1, 1926.

Mr. Patterson, with long experience and observation in the earlier days of transportation development in Philadelphia, has been one of the warmest advocates of co-operation as typified by Mitten Management. His participation with the P. R. T. and Mitten Management will be less active, but they will still have the benefit of his counsel and encouragement.

Albert M. Greenfield & Company, which negotiated the purchase of the Frankford, Tacony & Holmesburg Street Railway by the Philadelphia Rapid Transit will succeed Mr. Patterson.

Ernest Stenger Heads Denver Water Board

Ernest Stenger, who piloted the Denver Tramway, Denver, Col., through receivership and was elected president of the Tramway when it was reorganized, has been selected by Mayor Stapleton to head the Denver Water Board. The position will in no way interfere with his duties as president of the tramway, but is in itself a great honor. The newspapers and citizens were insistent that the Mayor get a man to head the water board who would improve conditions. Mr. Stenger is a degree man in civil engineering from the University of Michigan, has served the Denver & Rio Grande Railroad as a general superintendent, the Union Pacific Railroad as superintendent and is known as a builder.

R. W. Lamar Chief Engineer at Birmingham

Robert W. Lamar has recently been appointed chief engineer of the Birmingham Electric Company, Birmingham, Ala. In this capacity he fills the vacancy caused by the appointment of H. E. Cox to the position of assistant general manager. This appointment was referred to in the *ELECTRIC RAILWAY JOURNAL*, issue of Nov. 14, 1925, page 887. Mr. Lamar has had broad experience in engineering and utility business in the western and central states. He has been connected with the J. G. White Management Corporation and for several years with the Electric Bond & Share Company of New York, and affiliated companies. During the World War he was captain of engineers in the United States Army. Mr. Lamar was born in Indiana. He was graduated from Washington University, St. Louis.

Washington Bus Personnel

Messrs. Merrill and Shapiro Will Operate New North American Subsidiary in Nation's Capital

New officials in the persons of E. D. Merrill and Alexander Shapiro have been named to fill the posts of president and general manager and of assistant general manager respectively of the Washington Rapid Transit Company, a bus company of Washington, D. C. An announcement to this effect was recently made by F. W. Doolittle, vice-president of the North American Company, for whose interest the properties of the former company were recently acquired.

Both appointees are well known in the railway field. For the past two years Mr. Merrill has been traffic engineer for the Chicago Motor Coach Company and the Yellow Coach Manufacturing Company. Back in 1909 he joined the Union Pacific Railroad as assistant engineer, remaining with that road until 1913. A year later he joined the Puget Sound Traction Light & Power Company, Seattle. When he resigned from that organization in 1919 he was traffic engineer. Later he was identified with the Milwaukee Electric Railway & Light Company, a subsidiary of the North American Company, and became assistant superintendent of transportation. From 1920 to 1922 he was with the Philadelphia Rapid Transit Company as traffic engineer and assistant superintendent of transportation. During 1923 he was assigned to special study work for the Boston Elevated Railway, following which he joined the Cincinnati Traction Company as superintendent of schedules. In 1924 he lined up with the Chicago organization.

Mr. Merrill was graduated from the Massachusetts Institute of Technology in 1909.

Mr. Shapiro, who will assist Mr. Merrill in conducting the operation of the Washington Rapid Transit Company, recently went to Washington to make a survey of the lines of that company. At that time he held the position of commercial manager of the Wisconsin Motor Bus Lines, affiliated with the Milwaukee Electric Railway & Light Company, Milwaukee, Wis. Mr. Shapiro has long been identified with the North American Company. Back in 1922, when the bus operations of the Milwaukee Electric Railway & Light Company, expanded so rapidly that a reliable man was needed to supervise their operations, he was chosen, along with Sylvester Henningfeld. At that time he was statistician and assistant in the executive department of the Milwaukee company. In 1914 Mr. Shapiro joined the staff of the American Electric Railway Association as assistant in the bureau of fare research. He was later retained by the association as assistant statistician and for more than a year was in charge of the association's bureau of statistics and information. In 1919 he was retained by the Committee of One Hundred of the association on work in connection with the Federal Electric Railways Commission investigation. He went to Milwaukee in the spring of 1920 as statistician in the executive department. Later he became interested in operating work

and for nearly a year acted as secretary of the company's transportation committee, which passes on all problems arising out of the operation of the company's railway and bus utilities.

Mr. Shapiro was graduated from the College of the City of New York, where he received his preliminary engineering training and where he specialized in statistics, economics and accounting.

Appointment of R. V. Taylor to I.C.C. Reported Favorably

The Senate interstate commerce committee has decided to report favorably the nomination of R. V. Taylor of Alabama to the Interstate Commerce Commission.

An official poll of the interstate commerce committee was declared on Jan. 26 to show nine votes to eight of the Senate for a favorable report on the nomination of Thomas F. Woodlock, New York, who now holds a recess appointment on the Interstate Commerce Commission. After the committee has reported, leaders said, a poll of the Senate would be made, and should it show a majority against the nomination the wishes of President Coolidge would be consulted.

Roy C. Cram Resigns from Brooklyn Company

Roy C. Cram has resigned from the Brooklyn-Manhattan Transit Corporation, with which he has been connected since 1912. At present he is engaged on a special assignment connected with one of the railways in the metropolitan district, but he has not yet fully matured his plans for the future. The new work and some personal matters on which he is engaged, by their very nature, have made it impossible for Mr. Cram to devote to the work of the office of president of the A. E. R. E. A. the time and attention that he had hoped to give to it and so he has resigned his official association affiliation.

Roy Cram has been engaged in electric railway work since 1898. During a considerable part of that time he has been active in state and national railway association affairs. He has also been a frequent contributor to the engineering and technical press. His long career in the industry was reviewed in the *ELECTRIC RAILWAY JOURNAL* for Oct. 10, 1924, page 634. It is understood that one of the proposals which he has under consideration contemplates his withdrawal to a line of endeavor not connected with railway work on its operating side.

John G. Baukat has returned to the electric railway field in the capacity of consulting engineer for the New York Railways, New York City, N. Y., where he will devote his attention to general designing and development work. For the past few years Mr. Baukat has been occupied in general consulting engineering work, principally designing and superintending the building of trolley car equipment and electric locomotives. Prior to that, from 1921 to 1923, he was president and general manager of the Batavia Car Works, Batavia, N. Y., which he organized and operated until

other interests bought the company. Mr. Baukat also served as mechanical engineer of the Hydro-Electric Power Commission of Toronto, Canada, in charge of electrifying the London & Port Stanley Railway. This job included the design and construction of all rolling stock and shops. He was also in charge of the equipment and shops of all railway properties controlled and operated by the Hydro-Electric Power Commission in Ontario.

George W. Struble has resigned as claim agent of the Oklahoma Railway, Oklahoma City, Okla., after twenty years in the service of the company. Mr. Struble began as a motorman and earned successive promotions until he reached the position of claim agent of the company. He expects to devote his time to his farm.

R. B. White, general manager of the local division of the Baltimore & Ohio Railroad at New York, included in which is the Staten Island Rapid Transit Railway, recently electrified, has been elected vice-president of the Central Railroad of New Jersey. He is well known among electric railway men and is at present a member of the committee on rapid transit of the American Electric Railway Association.

Charles A. Halbert, in the service of the Wisconsin Railroad Commission since 1913, and now chief engineer of that body, has been appointed State Chief Engineer to succeed Arthur Peabody, resigned.

David A. Ellis, since 1919 a member of the Massachusetts Department of Public Utilities, has resigned and at the close of a Mediterranean trip will devote himself to the practice of law at Boston.

Fred P. Snyder, who has been connected with the Oakwood Street Railway, Dayton, Ohio, since 1922, has been appointed general manager of the company.

R. J. Higgins, attorney for the bondholders of the Kansas City Railways, Kansas City, Mo., has become a law partner of Senator James A. Reed. The firm name will be Reed, Holmes, Higgins & Taylor. Mr. Higgins formerly was counsel for the railways at Kansas City and is a former city attorney of Kansas City, Kan.

W. W. Box, Birmingham, Ala., has been appointed chief clerk in the passenger and freight office of the Oklahoma Railway, Oklahoma City, Okla., succeeding Carl E. Knoepfel, who has accepted a position as rate clerk in the freight office of the Rock Island Railroad.

R. L. Loy, Jr., became claim agent of the Oklahoma Railway, Oklahoma City, Okla., on Jan. 1, succeeding in this capacity George W. Struble, resigned. Mr. Loy went to the Oklahoma Railway from the Rock Island Company, having been with that railroad since 1910 and having served in the claim department since 1913. After finishing school Mr. Loy was employed in a bank for a year. He then began his service with the Rock Island. Here he attracted the attention of the receivers of the Oklahoma Railway. He was born in Effingham, Ill., and went to Shawnee with his parents in 1906.

Obituary

W. H. Maltbie

William H. Maltbie, counsel for the United Railways & Electric Company, Baltimore, and one of the most prominent lawyers of that city, died on Jan. 23 at St. Agnes' Hospital, Baltimore, after an illness of about a week. His death was due to pneumonia. The last important case for the railway in which Mr. Maltbie participated was the valuation hearing held last year by the Maryland Public Service Commission. The decision in this case has not been rendered.

Mr. Maltbie had earned for himself a national reputation as an authority on the question of public utility valuations and as a publicist on this and other questions. He was the author of "The Theory and Practice of Public Utility Valuations," but this work represented only a small part of his contribution to the constructive thinking



W. H. Maltbie

on this subject. One of the last pieces of writing that he did was the preparation of the article "Valuation Principles in Baltimore Case," contributed by him to the issue of the *ELECTRIC RAILWAY JOURNAL* for Jan. 9.

Men marveled at the clearness, force and elegance of the Maltbie contributions to the literature on utility subjects and the oral discussion of such subjects by him, but the answer was not far to seek. It was to be found in the early scholastic training of the man and in his insistence, without being pedantic, that things should be right. Indefatigable industry was at the bottom of it all. As the *Baltimore Sun* so aptly said, vague thinking, loose verbiage, obscure objectives, all were hateful to him. That paper said editorially:

His sudden, tragic passing causes, therefore, a gap in the life of the city that will not be filled. The ranks appear to close up when such a man crosses the river, but the appearance is deceptive. His peculiar combination of brains, character and diverse, yet deep, training cannot be duplicated. There is no one just like him in our community.

It is impossible to do more than to set down a part of his contribution to the work of the American Electric Railway Association. He was counsel for the association in the railway mail pay case and special counsel for the asso-

ciation in connection with the study of the subject of depreciation of electric railway properties made by the Interstate Commerce Commission with the idea of establishing definite rates to be applied to the various classes of electric railway property. He was also chairman of the committee on special taxes and a member of the committee on traffic congestion.

Seldom is it that a man develops the well-rounded ability that was possessed by W. H. Maltbie. For less than ten years he had focussed his attention on public utilities, yet engineering, operation and finance were so blended with his more intimate knowledge of law that his solution of problems showed a well-balanced appreciation of all the major factors that made his practice marked in its thoroughness.

Mr. Maltbie received his early education in Toledo and in Iowa and was graduated from the Ohio Wesleyan University. Upon his graduation he went to Baltimore, where he took a course in economics, mathematics and physics at Johns Hopkins University. Later he became professor of mathematics at Goucher College, Baltimore, and studied law. He was graduated from the University of Maryland Law School and was admitted to the bar. He remained at Goucher College until 1910. The following year he became president of the Merchants & Manufacturers Association. He was elected to the Maryland General Assembly in 1912 and while a member of that body was responsible for much constructive legislation. Mr. Maltbie was the first head of the Bureau of Municipal and State Research and following this served as a member of the City Charter Commission. During the war he was appointed assistant food administrator for the state and took full charge of this work when the administrator resigned.

Mr. Maltbie's intimate knowledge of law and mathematics and his untiring efforts to bring about improvement in every possible way were largely responsible for his appointment a few years ago as a member of Mayor Howard W. Jackson's Commission on Economy and Efficiency. He played an important part in the work of this body, which has brought about a real business administration in the city government. The work of this commission has attracted attention all over the country.

At the time of his death Mr. Maltbie was a director of the Baltimore Association of Commerce. He also had an important part in establishing the Sherwood Forest community, near Baltimore. Mr. Maltbie was born at Toledo, Ohio, in 1867.

Frederick M. Staunton

Frederick Marshall Staunton, president of the Charleston Interurban Railway, Charleston, W. Va., and one of the most prominent business men of that city and the Kanawha Valley, died on Jan. 20 at his home in Charleston. His activities in the traction line began with his reorganization of the original company into the Interurban company. It was during his administration that the Interurban company branched out and added the traction lines to Cabin Creek Junction and

St. Albans, later acquiring the Dunbar line. He was also president of the Kanawha Banking & Trust Company and until about four years ago was president of the Diamond Ice & Coal Company. He organized these companies and developed their affairs. Mr. Staunton was 60 years old.

Frederick A. Huntress

Frederick A. Huntress, for many years an official of the Brazilian Traction, Light & Power Company, Ltd., operating in the cities of Rio Janeiro and São Paulo, Brazil, died at Boston on Jan. 27. He had been connected with electric railways in Boston, Montreal, Halifax, N. S., and Worcester before he was chosen in 1905 as the first manager of the Rio Janeiro property. Later he was made first vice-president and general manager of the company, becoming one of the best known North Americans in Brazil. He returned from South America in 1922, and had resided since in Lenox and Boston.

Mr. Huntress was a brother of F. E. Huntress, president of the Neal Electric Headlight Company, who died Dec. 19.

Frederick N. Parsons, superintendent of the department of electrical repairs for the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., died on Jan. 11. Mr. Parsons had been connected with the Brooklyn railways almost continuously for the past twenty-eight years. He went with the old Nassau Railroad, a surface line, in 1898, served as foreman of the electrical department of the Brooklyn Rapid Transit Company from 1902 to 1907 and as superintendent of that department from that time until his death. His quiet, unassuming manner made many friends for him in the railway industry and his close attention to the details of electric railway equipment made his department the barometer of the system. Previous to his work in Brooklyn Mr. Parsons was connected with the Steel Motor Company and the Lorain Steel Company. He was 57 years old.

Judge Bernard F. Brough, who retired as Mayor of Toledo, Ohio, on Jan. 1, died on Jan. 14 after a brief illness. He served as Mayor four years. He took a keen interest in traction matters, so much so that he addressed one of the annual meetings of the American Electric Railway Association. Judge Brough was a close friend of Frank R. Coates, president of the Community Traction Company and president of the American Electric Railway Association. He was 54 years old.

Ernest Benedict, one of the oldest railway engineers in England, died on Dec. 1 at the age of 87. He was one of the last if not the last of the engineering pupils of Isambard Kingdom Brunel and was associated with the construction of the long-time famous steamship the *Great Eastern*. For many years he held important railway posts in India. On returning near the end of last century he became engaged in engineering journalism and for some years was secretary of the Tramways and Light Railways Association. For 53 years he was a member of the Institution of Civil Engineers.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Rubber Monopoly Hit

Two Large American Concerns Formed to Stimulate the Independent Production of Rubber

Air continues to leak out of the crude rubber balloon as American consumers maintain their policy of watchful waiting. Prices in England have been steadily falling since the peak of the boom was reached several weeks ago and some speculators in rubber stocks have become rather panicky, making frenzied efforts to unload their holdings on a sluggish market. Some observers have declared this to be a result of the political turmoil engendered in United States government circles over this commodity. Whether this is actually the case or not does not seem to be the principal consideration. The main fact is that prices of the British monopoly continue to fall, while concerted efforts are being made by American interests to cope with the rubber situation without federal treasury aid.

This point was made by Secretary Hoover in a report to the House interstate commerce committee on Jan. 18. No slackening in American ventures in this field has occurred as a result of the policy of the administration to advise against government loans to those interested in plans for breaking the back of the British monopoly.

Two very positive steps have been taken in this program. One of these is the formation of a \$10,000,000 organization—the American Motor Rubber Company—whose function will be to stimulate independent production of rubber, and the other is the formulation of plans for a \$50,000,000 organization to invest in rubber plantations, now being worked out by the Rubber Association of America. Details of these two proposals are not yet available. Co-operative buying by American consumers has also been mentioned as a valuable aid in meeting the situation.

Promotions in Timken Executive Personnel

Ernest Wooler has been appointed chief engineer of the Timken Roller Bearing Company, Canton, Ohio. This office will entail his taking full charge of all automotive, industrial, experimental and service engineering. For the past year he has held the position of automotive engineer. He is an Englishman by birth and has had experience in both American and European engineering and manufacturing practices. His qualifications for the responsible position which he now assumes are therefore unquestioned.

For the past twelve years Mr. Wooler has been an active member of the Society of Automotive Engineers and the Institution of Automobile Engineers, which is the recognized Brit-

ish society. He has held important positions with many automotive manufacturing companies, both in this country and abroad, and has designed and supervised the building of many motors and other types of automotive equipment.

Other changes in the executive personnel of the Timken company include the promotion of J. W. Spray to the position of manager of sales, automotive division; those of E. W. Austin and R. W. Ballentine to be assistant managers of sales, automotive division, and that of Peter C. Poss to be assistant advertising manager. Mr. Poss has been in the advertising department of the Timken company at Canton since joining that organization. He was formerly with the Penton Publishing Company, Cleveland.

Gas-Electrics May Be Purchased Soon

Rumor has it that the Missouri-Pacific may shortly purchase a large number of gas-electric rail cars for use on its short lines. W. H. Fetner, chief mechanical engineer of the Missouri-Pacific Lines, was one of the officials aboard the St. Louis-built gas-electric car which was recently delivered to the Seaboard Air Line after a trial run from St. Louis to Memphis. While he refused to divulge the purpose of his trip, it has been noised abroad that the Missouri-Pacific is investigating the various types of rail cars now on the market with a view to finding the one best adapted to its own requirements.

Convention Interprets Coast Tendencies in Bus Design

Pacific Coast problems in the design of buses were discussed on Bus Day at a convention of Mack salesmen and representatives in Seattle, Wash. The principal speakers were D. Lloyd Smith and George H. Scragg. As interpreted by these speakers and in the discussion a demand is felt in the Northwest for lighter weight buses, more powerful brakes, higher speed and better body construction. All steel bodies are growing in favor and operators desire larger seating capacity. The place of the 14 to 21-passenger stage is slowly being superseded by the 25 to 29-passenger parlor car.

These tendencies are the result of growing attention to safety and comfort, according to the opinions expressed. Blinding fogs, winding roads and quick changes from high altitudes to sea level encountered in bus operation in the Northwest are the primary causes of the new designs.

Extensive promotions of personnel will be effective on Feb. 1, it was announced. H. H. Harwood, manager of the Portland branch, will become as-

sistant to J. A. Stoner, vice-president and general manager of the Pacific Coast organization. C. C. Eickelberger,

Seattle branch manager, will be special representative and territorial supervisor of the Pacific Northwest.

St. Louis Builds Large Gas-Electric Cars

Two New Units Designed for Seaboard Air Line—Comparative Tests of Bearing Equipment to Be Made—Torsional Strains in Body Are Largely Eliminated

DELIVERY of the first of two gas-electric passenger rail cars ordered by the Seaboard Air Line Railroad has been made by the St. Louis Car Company. The second car is ready for delivery. A trial run was made by the first car from St. Louis to Indianapolis over the line of the Big Four Railroad on Jan. 14. The 267 miles were covered in six hours 48 minutes, which is considered to be an excellent record, in view of the fact that the average running time for Big Four passenger trains on the same run is six hours. No especial attempt was made to attain a high running speed.

The two cars were built by the St. Louis Car Company and the Electro-Motive Company. They are among the largest cars yet erected in this country, their length over bumpers being 71 ft. 3½ in. A passenger compartment with a capacity of 34 persons and a capacious baggage compartment are provided. From the standpoint of flexibility of service, the value of the cars is greatly enhanced by the fact that they are capable of hauling three standard passenger coaches as trailers.

In designing the engine room and operator's compartment every effort was made to keep space requirements to a minimum. All of the various operating units are inclosed, thus eliminating all danger from exposed moving machinery. In the usual course of operation the engineer need only think of his throttle, controller and the air brake. There is no need for mechanical adjustments on a run made under ordinary conditions.

The prime mover of the power plant consists of two 200-hp., six-cylinder moderate speed gasoline engines, specially designed for railroad service by the Winton Engine Company of Cleveland, Ohio. Unlike other railroad gasoline engine equipment, it is not an adoption of a marine or automotive type of engine, but conforms to standard railroad practice in the use of standard United States threads and other construction features. Simplicity, rigidity and accessibility are outstanding characteristics of this design of engine.

All electrical equipment was designed

and built by the General Electric Company. The generators are mounted on the same bases as the engines and are 700-volt direct-current machines especially designed for these cars. They are excited separately. The voltage of the generators is regulated by the current demands of the motors and the en-

been delivered. The other unit will be provided with standard A.R.A. journal boxes and brasses throughout. After the two cars have been in service for a certain period, in which the power consumption on each will have been accurately measured, the bearing equipment will be interchanged and the observations continued. In this way it is hoped to determine the operating characteristics of the two types on a competitive basis. The periods of observation will of course be equal.

In designing the car the manufacturers gave especial thought to the elimination of torsional strains and the shocks usually caused by crossings, switches, curves and back tracks. Another decided advantage is the accessibility of all parts of the engine.



Completed Car Delivered to Seaboard Air Line

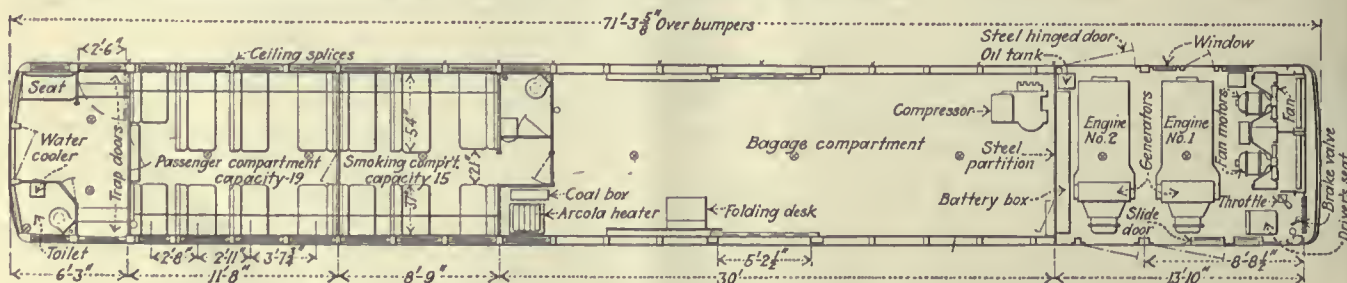
gines are designed to operate at their most efficient speed regardless of the load applied. Twin motors are provided on both the front and rear trucks of the car.

The auxiliary equipment consists of an electrically driven air compressor, which furnishes air for standard Westinghouse combined straight and automatic air brake equipment and for starting the engine. Motor-driven fans cool the engine jacket water in honeycomb radiators. Current for the lighting system is furnished by storage batteries which are charged by the exciters of the generators. A 12-in. x 12-in. compressor cylinder and a type J slack adjuster are embodied with the Westinghouse air brake equipment. The signal system is Westinghouse type M, with standard couplings and hose.

Hyatt roller bearing equipment is provided on the car which has already

The steel partition between the engine room and the baggage compartment is bolted to special steel frames so that it may be easily removed when necessary. In addition, the whole side of the engine room may be removed if it is desired to remove the engine or other parts of the power plant for repairs or replacement.

All-steel construction is used in the car body, while the inside finish is of wood. Every effort is made to insure a maximum of strength while at the same time eliminating all unnecessary weight. Without load the weight of the car is 110,000 lb. The general design of this type of car is such that modifications in the superstructure may be made to meet specific requirements. The exterior finish of the car is olive green. A capacity run of about 450 miles without refueling is claimed for these units.



Floor Plan of Car. Note Compactness of Engine Room and Effective Arrangement of Passenger Compartments

A list of the principal dimensions of the car is given here:

Length of car over bumpers.....	71 ft.	3 3/4 in.
Width of car over all.....	9 ft.	10 1/2 in.
Height of car, rail to top of roof.....	12 ft.	6 3/4 in.
Length of baggage compartment.....	30 ft.	
Length of passenger compartment (capacity 34).....	11 ft.	8 in.
Length of engine room and operator's compartment.....	13 ft.	10 in.
Truck centers.....	50 ft.	10 1/2 in.
Wheel centers.....	6 ft.	6 in.
Post centers and seat centers.....		35 in.
Diameter of wheels.....		33 in.

Need for Quasi-Judicial Body Not Met by Trade Commission

Failure of the Federal Trade Commission to develop along judicial lines, as have other similar bodies of specialists, such as the Interstate Commerce Commission and the admiralty courts, is regarded as mainly responsible for the demand for its abolition. That there is a great need for a quasi-judicial body to deal with matters of unfair practice is admitted, but it will have to establish its principles out of precedent and experience.

The instinct of the people is against an institution in which the judges do the charging. The examiners and attorneys of the Interstate Commerce Commission, for instance, come before the commission in much the same way as the representatives of the Attorney-General go before the Supreme Court. They are in the same category as the representatives of the other party to the case and decisions frequently go against them.

There is evidence that the attempt of the Federal Trade Commission to fly in the face of the experience of a thousand years is unsuccessful, as its record shows that it has been wrong about 75 per cent of the time and has set up no fundamental principles which can be followed.

Vote on Pressed Steel Merger Feb. 17

Stockholders of the Pressed Steel Car Company will meet on Feb. 17 to act on the proposed merger into the company of the Western Steel Car & Foundry Company, one of its subsidiaries. Changes in the capital structure, through an exchange of stocks, is provided.

The agreement provides that upon the merger becoming effective, the corporate existence and name of the Pressed Steel Car Company shall continue with a total authorized capital consisting of \$16,200,000 par value of preferred stock and \$46,300,000 par value of common stock, of which there will be outstanding upon the completion of the merger \$15,000,000 of preferred stock and \$12,500,000 of common stock, against \$12,500,000 of preferred stock and \$12,500,000 of common stock now outstanding.

Mack Bus Shipments

Shipments of buses by Mack Trucks, Inc., during 1925 were 159 per cent larger than in 1924 and during the last six months of the year exceeded by 100 units shipments for the entire year 1924.

New Equipment Will Supply Traction Power in Philadelphia

One of the largest pieces of electrical machinery of its kind ever designed, representing an investment of close to \$500,000, has been ordered by the Philadelphia Electric Company from the Westinghouse Electric & Manufacturing Company. The contract also calls for delivery of eight huge oil breakers having a voltage of 73,000 and a rupturing capacity of 1,500,000 kva. The machine, known as a frequency changer, upon completion next fall, will be installed in the Schuylkill River station of the Philadelphia Electric Company, which furnishes energy to both the Philadelphia Rapid Transit Company and the Pennsylvania Railroad. Another engineering feat of record-breaking proportion for the Richmond station of the Philadelphia Electric Company is the installation this month of six giant Westinghouse tap-changing transformers, each of 20,000 kva. capacity. Including the frequency changer, the total amount of the contracts awarded in this group aggregates nearly \$750,000.

Problems of Roller Bearing Adaptation Are Interesting

Adapting roller bearings to the demands of modern car practice gives rise to many interesting problems. Each type of car has certain factors of weight, operating conditions, rated speed, etc., which require peculiar modifications. How these conditions are being met by SKF Industries is explained very clearly in a little booklet entitled "The Spherical Roller Bearing and Railway Journal Boxes." Four representative types of cars are considered, the single-truck safety car, the storage battery car, gasoline and Diesel electric cars.

Heavy duty spherical roller bearings have proved their worth on these and many other types of units. An important fact to consider in the modernization of used rolling stock is the facility with which existing plain bearing equipment can be changed over to roller bearings. That it is desirable to make this change is shown from the records of 500,000 car-miles operation in high-speed passenger service which spherical roller bearings have established.

American Brown Boveri Acquires Two New Companies

American Brown Boveri Electric Corporation has recently acquired two additional properties, namely, the Railway & Industrial Engineering Company, Greensburg, Pa., and the Electric Development & Machine Company, Holmesburg, Pa., near Philadelphia. These latest acquisitions will considerably amplify the present line of American Brown Boveri electric products. In addition to these properties, the corporation has in operation its plants at Camden, as well as those of the Condit Electric Manufacturing Company, Boston; the Scintilla Magneto Company, Sidney, N. Y., and the Maloney Electric Company, St. Louis.

The newly acquired companies specialize in high-tension switching and protective equipment for power companies.

Brill Merger Is Culminated— Election of Officers Soon

Plans for the formation of the new Brill Corporation, which controls the J. G. Brill Company and the American Car & Foundry Motors Company, have been declared operative. A meeting of stockholders for the election of officers is expected shortly and at the same time announcement will be made of final details concerning the operation of the merger. It is expected that this organization of the new Brill Corporation will play an important rôle in the fortunes of the American Car & Foundry Company, which controls a majority interest in the new company. Strong hopes are held that the earnings of the Brill Corporation will be more than sufficient to yield Car & Foundry on its controlling shares returns in excess of the preferred dividends on the parent company's \$30,000,000 of preferred stock, requiring \$2,100,000 a year.

While the Brill Corporation will undoubtedly contribute very materially to the financial well-being of Car & Foundry, it should itself shine somewhat in the reflected prestige of its controlling mentor. In other words, both parties to the agreement should profit materially. If the results hoped for from the Brill Corporation are attained, they will add largely to the balance available for Car & Foundry common stock, leaving all earnings from the car business for that issue. Complete information concerning the various ramifications of the merger is given in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 16.

Metal, Coal and Material Prices

Metals—New York		Jan. 26, 1926
Copper, electrolytic, cents per lb.....		14.00
Copper, wire base, cents per lb.....		16.00
Lead, cents per lb.....		9.25
Zinc, cents per lb.....		8.35
Tin, Straits, cents per lb.....		61.625
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.....		\$4.875
Somerset mine run, Boston, net tons.....		2.175
Pittsburgh mine run, Pittsburgh, net tons.....		2.05
Franklin, Ill., screenings, Chicago, net tons		1.875
Central, Ill., screenings, Chicago, net tons		1.425
Kansas screenings, Kansas City, net tons..		2.30
Materials		
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.....		\$7.00
Weatherproof wire base, N. Y., cents per lb.		17.75
Cement, Chicago, net prices, without bags		2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.		11.20
White lead in oil (100-lb. keg), N. Y., cents per lb.....		15.50
Turpentine (bbl. lots), N. Y., per gsl.....		\$1.01

Track and Line

Memphis Street Railway, Memphis, Tenn., has announced that it will spend about \$213,000 on tracks.

Los Angeles Railway, Los Angeles, Cal., is now at work on the second section of a track improvement job extending from 63d Street to Manchester Avenue on Vermont. The track is laid in private right-of-way in this section and is being lowered to con-

form to the adjacent street grade. Cement curbs and landings are being built and the entire surface will be graveled and oiled. The first section, extending from 63d Street to Florence Avenue, cost \$20,000, and the second section, from Florence to Manchester Avenue, will cost \$50,200.

New York, N. Y.—The Board of Transportation will be ready to let contracts aggregating between \$100,000,000 and \$150,000,000 for new subway construction this year. The board during the last year recommended contracts totaling about \$90,000,000, which have been approved by the Board of Estimate. Approval has been given to a contract with George H. Flinn, the lowest of seven bidders, for the construction of a section of subway in Eleventh Avenue between Eighteenth and 28th Streets and an appropriation of \$5,258,000 for the work.

Boston Elevated Railway, Boston, Mass., will improve its trackage in accordance with an order issued by the Massachusetts Public Utilities Commission, which in a single day gave certificates of approval of repairs, relocations and extensions in Boston, Belmont, Brookline, Cambridge, Chelsea, Everett, Medford and Somerville. In Boston the projects are:

Tremont Street, crossover 133 ft. long; Broadway, crossover 133 ft. long; Charles Street, 2,254 ft. of track; Dorchester Avenue, crossover 133 ft. long; Dover Street, 204 ft. of track and 1,171 ft. of track; Blue Hill Avenue, Roxbury, 367 ft. of track, including two crossovers; Blue Hill Avenue, at Franklin Park, Dorchester, 898 ft. of track, including crossover; East Eighth Street, from H Street to K Street, outbound track, 1,020 ft. in length; Charles Street, from Cambridge Street to Eruil Street, 599 ft. of track; Lotus place terminal, Forest Hills, special work; Dorchester and East Eighth Streets, South Boston, curved track, 725 ft. in length; Elliot Square, Roxbury, 873 ft. of track; Washington Street, crossover 133 ft. long; Park Street, Dorchester, 4,071 ft. of track; Harrison Avenue and Beach Street, 112 ft. of track; Neponset terminal, Neponset, 2,331 ft. of track; Talbot Avenue, 9,061 ft. of track, including 133 ft. of special work; Dorchester Avenue, South Boston, crossover 133 ft. long; Chelsea Street, Charlestown, 1,351 ft. of track; Neponset Avenue, Dorchester, 3,777 ft. of track; Beacon Street bridge over Boston & Albany Railroad, 1,107 ft. of track.

Belmont—Belmont Street, 2,458 ft. of track; Leonard Street, 1,004 ft. of track; Trapelo road, 3,311 ft. of track, including crossover 133 ft. long.

Brookline—Boylston Street, at Lee Street, crossover installed, 362 ft. of track.

Cambridge—Western Avenue, at Blackstone Street, crossover 133 ft. long; Cambridge bridge, at First Street, 602 ft. of track, including two crossovers; Somerville Avenue, 398 ft. of track.

Chelsea—Central Avenue, 2,253 ft. of track.

Everett—Ferry Street, 2,677 ft. of track, including crossover; Elm Street, 4152 ft. of track; Broadway and Chemical Lane, 502 ft. of track; Broadway, at Thorndike Street, 144 ft. of track in branch-off to power station.

Medford—Main Street, north of Buzzell's lane, crossover 133 ft. long; Boston Avenue, inbound track, 5,241 ft.; Curved track at Salem Street and Fellsway, 253 ft.

Somerville—Summer Street, 261 ft. of track; Cross Street, 1,889 ft. of track; Somerville Avenue, 2,877 ft. of track; Boston Avenue, 1,300 ft. of track.

Boston and Cambridge—Harvard bridge, 4,403 ft. of track, in connection with reconstruction of bridge.

Somerville and Boston—Washington Street, Somerville, and Cambridge Street, Charlestown, from near Tufts Street to 233 ft. east of Somerville line, 4,057 ft. of track.

Somerville and Medford—College Avenue, 4,063 ft. of track.

Philadelphia, Pa.—Payments aggregating \$2,723,952 have been made by the City Treasurer on warrants issued by

Director Ehlers of the Department of Transit on account of work on the construction of the various units of the subway on Broad Street. The amount paid to each contractor follows: Keystone State Construction Company, contractor for the section between Filbert and Stiles Streets, 1,335,804. Patrick McGovern, Inc., section between Clearfield and Courtland Streets, \$372,441. Patrick McGovern, Inc., section between Courtland and Chew Streets, \$540,347. Patrick McGovern, Inc., section between Chew and Grange Streets, \$475,359.

Power Houses, Shops and Buildings

Nashville Railway & Light Company, Nashville, Tenn., has completed its \$35,000 railway substation at Colorado Avenue and 41st Street.

Pacific Electric Railway, Los Angeles, Cal., is erecting a new station in Alhambra at West Main Street and Raymond Avenue to cost approximately \$4,500. The new structure will house the ticket, freight and express offices and will contain waiting rooms.

\$500,000 Terminal Opened in Montreal.—Montreal's new \$500,000 street railway passenger terminal station has been opened for public service by the Montreal Tramways. The new terminal is situated on Craig Street West, corner of Cote Street, opposite the Street Railway Building, and next to the Power Building.

Williamsport Railways, Williamsport, Pa., plans to construct a carhouse on West Third Street. The present carhouse on West Fourth Street will be abandoned.

Trade Notes

Fageol Company, Canton, Ohio, delivered to the Miami Beach Railway, Miami, Fla., ten gas-electric buses, type ADS-GE, during the period extending from Jan. 1 to Jan. 15. These buses were equipped with Westinghouse air brakes and the electrical equipment was supplied by the General Electric Company.

Charles J. Brickley has become connected with the Electric Service Supplies Company, Chicago. He has been connected with the Benson Electric Company, Central Electric Company and for a time operated an electrical construction company of his own. Recently Mr. Brickley has been with the Electric Steel & Sales Company, Milwaukee. He will cover Wisconsin and upper Michigan.

William K. Vanderpool has been made vice-president and executive engineer of the Okonite Company and the Okonite-Callender Company, Inc., manufacturers of wire and cables for electric purposes, with factories at Paterson and Passaic and general offices in New York City. Prior to assuming his new duties, Mr. Vanderpool was general superintendent of distribution of what is now the electric department of the Public Service Electric & Gas Company, Newark, N. J. He affiliated himself with Public Service in 1907 as superin-

tendent of distribution for the Essex district. He has also had considerable mining experience.

Graham Brothers, now a unit of Dodge Brothers, Inc., Detroit, Mich., is greatly increasing its output of buses. One of its new models which is gaining considerable popularity is a street car bus type, with a capacity for twenty passengers. It embodies many features suggested by experts at the American Electric Railway Association convention held last fall in Atlantic City. This company is also showing a new 32-passenger bus and a 60-passenger double-deck bus which will be in production within three months.

The Eisemann Magneto Corporation, New York, has announced important changes in its field staff. Irving W. Edwards, for the past year Pacific Coast representative, is transferred to Detroit, succeeding E. H. Hohenthal, resigned, as district manager. O. L. Bachman, who has acted as traveling service representative in the Detroit territory since 1919, becomes district manager on the Pacific Coast with headquarters at San Francisco. R. E. Dinnsen has been appointed assistant manager of the Chicago branch, succeeding C. M. Montz, resigned.

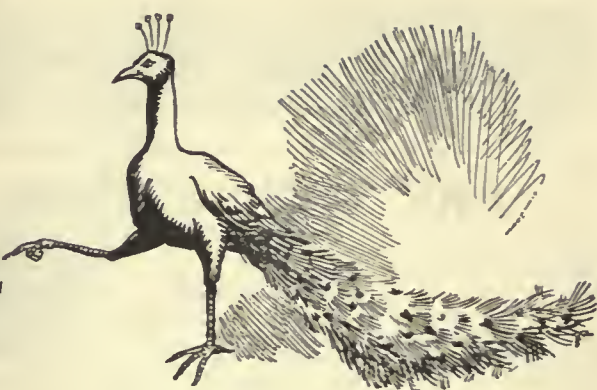
Mack Motor Truck Company, New York, announces through its office in Boston, Mass., that electric traction interests there purchased ten Mack buses during the last half of December. The Boston Elevated Railway bought five 29-passenger city type buses for operation between Union Square, Allston and Cambridge, a distance of 4 miles, for which a fare of 6 cents, 10 cents with transfer, will be charged. The schedule calls for 30 trips a day. Balloon tire equipment is used on these buses. Stone & Webster purchased for the Virginia Railway & Power Company five 230-in. bus chassis. The American Car Company will build the bodies and the buses will be put in service in Richmond, Va. The Boston & Worcester Street Railway purchased through F. T. Miller two 29-passenger Macks for operation between Saxonville and Framingham, a 4-mile route at a 10-cent fare.

Advertising Literature

Graybar Electric Company, New York, successor to the supply department of the Western Electric Company, has issued its annual electrical supply year book for 1926-27. More than 60,000 items are listed. All are shipped under the Graybar tag guaranteeing quality and service. There is a handy index at the back of the book, together with other useful features. Copies may be obtained from the Graybar company.

Linde Air Products, New York, N. Y., announce the combination of their two monthly publications into one magazine to cover a field formerly divided between the two. The new publication is known as the "Oxy-Acetylene Tip for the Linde Oxwelder" and starts with the acquired prestige of each of its predecessors. Articles of value to all interested in welding, from the seasoned executive to the studious welder, will be carried every month.

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of prevention—



Though almost any hand brake may provide a certain degree of braking power—it's the application in the emergency that prevents the accident.

To meet such emergencies as may occur, despite the best of air brakes, the Peacock Staffless Brake provides three times the power of the ordinary one and with a chain winding capacity of 144 in. it will hold brakes no matter what the brake rigging conditions may be.

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Let us send you further facts and figures.

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1. Oil Reservoir. Positively retains oil or grease and is exclusively a 13-E feature. To fill, remove the flathead screw shown in top of a swivel cap.
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3. Races—Inner and Outer. The races are made of "SHELBY" tubing, machined, hardened and ground.
4. Trigger Lock. Locks Pole Socket in horizontal position, enabling one man to change poles in the barn under low headroom.
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7. Pole Socket Bearing. Hardened Steel Bushing maintaining indefinitely a good close fit with axle pin No. 11.
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9. Adjusting Screw. One adjustment for all four springs.
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11. Axle Pin. Pole Socket Axle Pin made of hardened steel.
12. Dust Guard. Protects Roller Bearing from dust and water.
13. Accessibility. By removing these heavy locking screws and unhooking springs, the bearing cap can be removed, exposing swivel portion of base.



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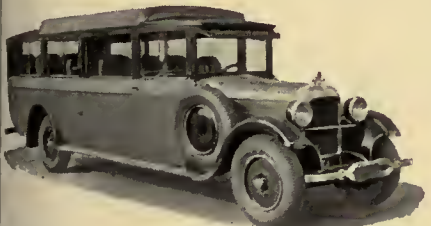
A NATIONAL ORGANIZATION

In 5 Distinct Ways

the New Studebaker Bus Chassis is increasing Profits for Operators



Studebaker 18-Passenger Cross-Seat Sedan-Type Bus. The Fitzsimmons Denver Bus Line operates this Studebaker between the Aurora Government Soldiers' Hospital and Denver, Colorado. Four other busses of this type are carrying passengers between Denver and Kansas City—a distance of 678 miles. This is claimed to be the longest bus route in the country.



Studebaker 15-Passenger Chair Car De Luxe. Three Studebaker Busses of this type are being operated by the Inter-State Transit Company, between San Francisco, California, and Portland, Oregon. This Chair Car De Luxe is ideal for inter-city and suburban service.



Studebaker 15-Passenger Chair Car De Luxe. Making daily trips between Muskogee and Eufaula, Okla., this Studebaker Bus is the latest addition to the Ward-Way fleet of nine busses. "It is the prettiest and slickest job of the lot, and passengers like to ride in it," writes Ward Faulkner, President, The Ward-Way, Incorporated.

HUNDREDS of bus operators, the country over, have proved the greater money-making possibilities of the new Studebaker Bus Chassis. Actual road experience, confirmed by cost records, has demonstrated that it positively insures more profit per passenger mile by cutting costs and attracting patronage in these five distinct ways:

1 Lower Initial Cost. Due to standardization of design and large-scale production, the first cost of the medium-capacity Studebaker Bus, complete with body, is about one-half the cost of the large-capacity bus.

2 Lower Operating Cost. Approximately 50% lower in weight than the average large-size bus. Records show it is actually 40% lower in upkeep and operation costs. Studebaker dependability cuts upkeep costs to the minimum, keeps busses on the road without interrupting earning power.

3 More Power. According to the rating of the Society of Automotive Engineers, the Studebaker Bus Chassis is the most powerful of its size in the world. There are 50 bus chassis with less rated horsepower and more weight. With its surplus power, the Big Six Studebaker engine can handle its load with greater ease. The chassis thus stands up better, insuring longer life and lower depreciation.

4 Greater Strength and Safety. Extra safety factors, including large rear axle shaft; oversize propeller shaft; deep frame, braced by eight stout cross-members; 4-wheel hydraulic brakes, etc., assure thousands of miles of safe, dependable, low-cost transportation.

5 Greater Comfort. The new Studebaker Bus Chassis provides passenger-car riding comfort. It has the low-hung frame and buoyant spring suspension of a passenger car. Springs are long and sturdy. Meeting the public's demand for utmost comfort plus safety, Studebaker Busses thus attract patronage.

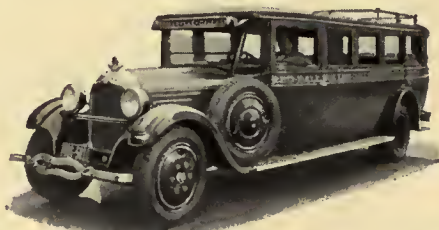
Because of these definite advantages, hundreds of operators are purchasing the new Studebaker Bus Chassis. The two sizes—158-inch wheelbase and 184-inch wheelbase—offer 6 different body types as below:

12-Pass. (including driver) cross-seat Sedan-Type	\$3785.00
15-Pass. (including driver) cross-seat Sedan-Type	\$4035.00
15-Pass. Parlor Car, Front Entrance Type	\$4800.00
19-Pass. (including driver) cross-seat Sedan-Type	\$4900.00
21-Pass. Pay-As-You-Enter Street-Car Type	\$5025.00
20-Pass. (including driver) Parlor-Car De Luxe	\$5575.00

Prices are f. o. b. factory and include full equipment



Studebaker 21-Passenger Pay-Enter Street-Car Type Busses. The West Flagler Terminal Lines, Inc., Miami, Florida, recently ordered 10 Studebaker Busses of this type—the first unit of thirty busses which the company will purchase for operation in city and suburbs.



Studebaker 18-Passenger Cross-Seat Sedan-Type Bus. Fine appearance, dependability and low operating cost were principal reasons for selecting this Studebaker Bus which is operated by the Red Ball Bus Line between Dallas and Greenville, Texas.



Studebaker 15-Passenger Cross-Seat Sedan-Type Bus. The J. A. Snyder Transportation Company, Joplin, Mo., owns and operates three Studebaker Busses. The Studebaker Bus shown above makes daily trips between Neosho and Joplin, Mo., and Pittsburg, Kansas. "Ride like a fine private car," "The last word in comfort," are comments from passengers.



Studebaker 18-Passenger Cross-Seat Sedan-Type Busses. The Chicago, North Shore & Milwaukee Electric Railroad is operating these Studebaker Busses between points on the company's rail lines and Kenosha, McHenry and Libertyville. Performance has been so satisfactory that a fourth bus of the 21-passenger street-car type was recently ordered.

Rivaling the highest-priced busses in every feature—except price!

Unexcelled luxury and comfort in this new Studebaker 20-Passenger Chair Car De Luxe, mounted on the most powerful bus chassis of its size in the world—price, \$5575



This New Studebaker 20-Pasaenger Chair Car De Luxe is being operated by the Balcer Brothers' Motor Coach Company between Tawas, Standish and Bay City, Michigan.

THIS new Chair Car De Luxe on the specially designed Studebaker bus chassis has taken the bus industry by storm. It has won instant and overwhelming approval due to its beautiful design and luxurious riding comfort. It combines remarkably low first cost—\$5575—with low operating cost.

In appearance and refinement of finish, this bus can be compared only with the large parlor-car busses selling for from \$10,000 to \$12,000.

Note the low-hung body with its graceful, tapering roof. Body framework is of selected hardwood. Finish is rich, durable lacquer.

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Entrance door is on the forward right-hand side. Door control mechanism is concealed, being operated by a small hand lever at the left of the driver's seat.

Individual arm chairs, with backs and cushions of genuine leather. Liberal leg and head room.

Among the interior features are mohair head and side lining, boquet window draperies, dome lights, six ventilators, etc. There is a railed-in baggage compartment at the driver's

right, and additional accommodation for luggage on roof.

Mounted on specially designed Studebaker bus chassis, this bus is ideal for intercity and suburban service. It has the speed, stamina and dependability to answer the most rigorous demands.

According to the rating of the Society of Automotive Engineers, the new Studebaker bus chassis is the most powerful chassis of its size in the world. There are 36 bus chassis on the market with *less* power and *more* weight.

Unusually Complete Equipment

Equipment includes stop-signal system; illuminated destination sign box (above windshield); automatic windshield cleaner; rear-view mirror; front and rear bumpers; motometer; extra tire and tube with spare wheel, mounted on left front fender; 8-day clock and gasoline gauge, plus the usual instruments.

Due to standardized design and large-scale production the new Studebaker Chair Car De Luxe is offered at a remarkably low price. Write for further description. Use the coupon below.

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GOODYEAR

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"We are trying to give our patrons not only a very convenient and very economical service, over our 900 miles of road between the Pennsylvania border and the Canadian line, but also a very comfortable and dependable one.

"Ours is by no means a difficult route. Practically every mile of it is improved. Yet it has its rough spots, and in season we have ice, snow and mud to battle.

"In this duty the performance of the Goodyear Tires with which

several of our buses are equipped has been most satisfactory.

"We have Goodyear Cord Bus Tires in service today that have given us *double* the mileage we have received from other pneumatic bus tires.

"They also double their advantage by giving us *trouble-free* mileage. They fit in exactly with our Lines' policy of providing the public with every essential and luxury of motorized highway transportation."

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Goodyear Bus Tires make records for long, economical, trouble-free mileage wherever they are used. The Goodyear Bus Tire line offers you the particular tire that is suited to your operating conditions.

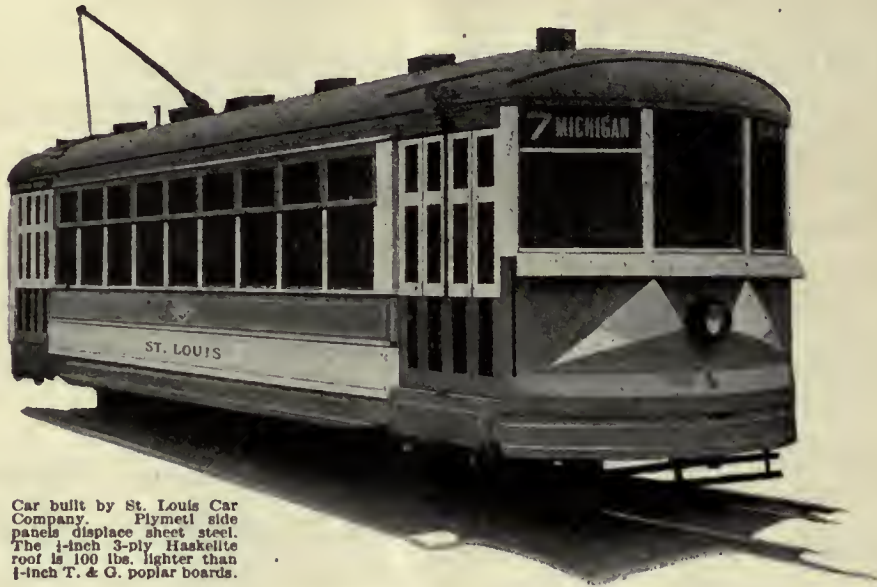
For every Goodyear Cord Bus Tire there is an equally fine Goodyear Tube, built especially to the needs of bus service

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HASKELITE *and* PLYMETL

on the Grand Rapids Cars



Car built by St. Louis Car Company. Plymetl side panels displace sheet steel. The 1-inch 3-ply Haskelite roof is 100 lbs. lighter than 1-inch T. & G. poplar boards.

THE Grand Rapids experiment is noteworthy as the first attempt on a large scale to see how far it is possible to go in cutting down weight through the selection of materials and careful design. The 27 cars recently ordered from the St. Louis Car Co., as the first result of this experiment, embody Plymetl side panels and Haskelite Roofs.

In the attempt to produce the lighter, faster, more attractive and more economical cars demanded by modern conditions, Haskelite and Plymetl possess unique advantages. They supplant heavier materials for roofs, head linings, interior and exterior panels, linings, trim and sub-floors. Joints are minimized. A stiffer, lighter, quieter, and more com-

fortable car results from the use of these materials. Haskelite and Plymetl are the logical materials for modern cars and are accepted as standard by prominent builders and operators today.

Our engineers will be glad to discuss the applications and advantages of these materials for your new or repair work.

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333 Timken-equipped busses for Newark, N. J.

The largest single bus order ever placed

The Public Service Railway Company of Newark, N. J., has placed with the Yellow Truck & Coach Manufacturing Company, of Chicago, an order for 333 single-deck, dual-drive gas-electric busses. This represents an expenditure of over \$3,000,000 and, so far as can be determined, is the largest individual order ever placed for motor busses.

Each of the vehicles will be equipped front and rear with Timken Axles, specially designed and built for Yellow Coaches.

The selection of axles was based on the simplicity and dependability of the worm drive principle, plus Timken painstaking workmanship.



THE TIMKEN-DETROIT AXLE CO., DETROIT, MICH.

AXLES

American BROWN BOVERI Power Rectifiers

Efficient in Sub-Station Service
under extreme load variation

Widely used in Europe for a number of years, Mercury-Arc Power Rectifiers have found their most popular application in the electric railway field. Their ability to effectively handle the fluctuations in load on railway lines without material loss in efficiency, from no-load, to high overload, is proved. There is no inertia of heavy rotating parts to be overcome.

On the accompanying chart are curves showing the comparative efficiencies of the three classes of conversion equipment—Rectifiers, Rotaries and Motor-Generators. This data was developed from actual tests. Note the great advantage of the mercury-arc rectifier at one-quarter load, an ordi-

nary condition on traction lines in non-rush hours.

Other advantages of the Mercury-Arc Power Rectifier are:—absolutely quiet operation, no moving parts except small auxiliaries, adaptable to full automatic operation, minimum maintenance required.

Further details of the principles, construction and operating features of this equipment will be given in subsequent advertisements.

Brown Boveri engineers have developed the Mercury-Arc Power Rectifier to a high degree of perfection in Europe. We are now prepared to build and install this type of equipment in America.

Products of American Brown Boveri Electric Corporation

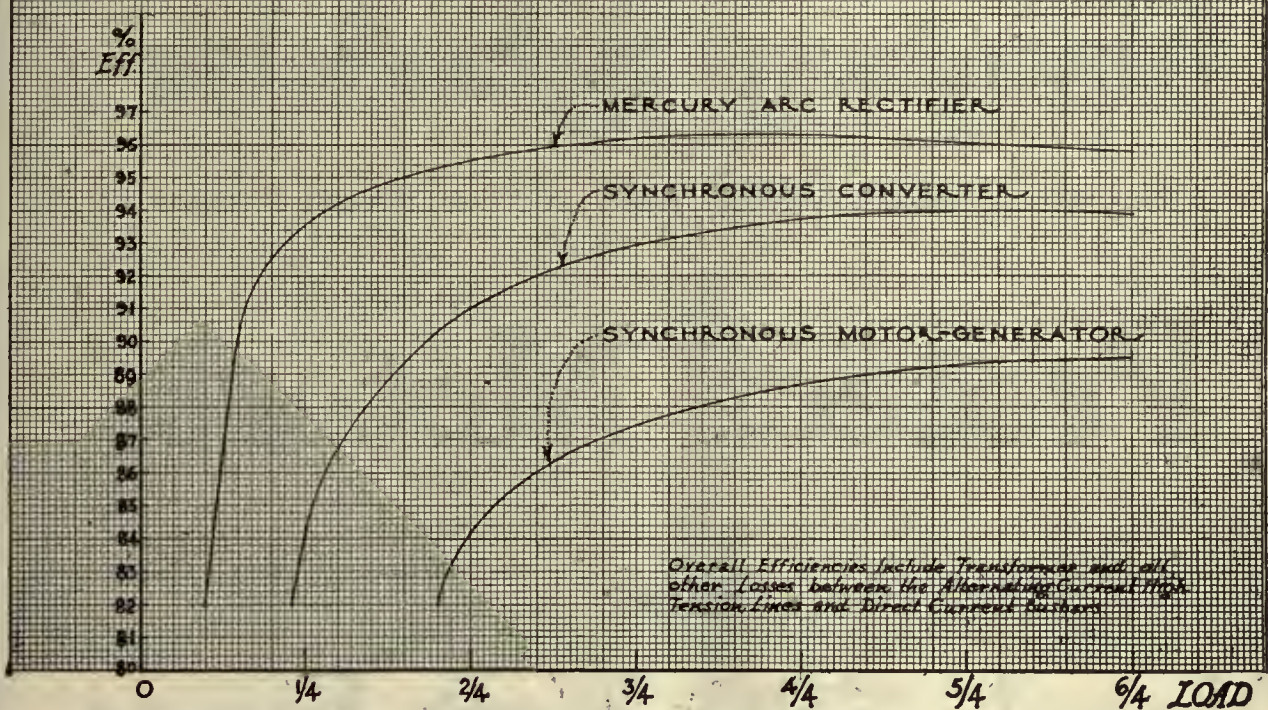
*Electric Locomotives
for any system of current, high or low
tensions
Complete Equipment
for railway electrification
Mercury-Arc Power Rectifiers
(steel enclosed)
Diesel-Electric Locomotives
Mining Locomotives*

*Motors (all sizes and types)
Rotary Converters
Motor Generators
Transformers (power or current)
Switches, Controllers
and all Auxiliary Equipment
Oil Switches
Condensers and Auxiliaries*

*Steam Turbo Generators
for normal or high pressures and
superheats
Automatic Regulators
Relays
Turbo Compressors and Blowers
Electric Furnaces
Induction Regulators*

Recommends

Mercury Arc—Steel Enclosed Power Rectifiers for Sub Station Service

Comparative Overall Efficiencies of Converting Apparatus*Graphic Comparative Efficiency with Rotative Equipment*

Mercury-Arc Power Rectifiers pay for themselves quickly where D.C. load factor is variable or low.

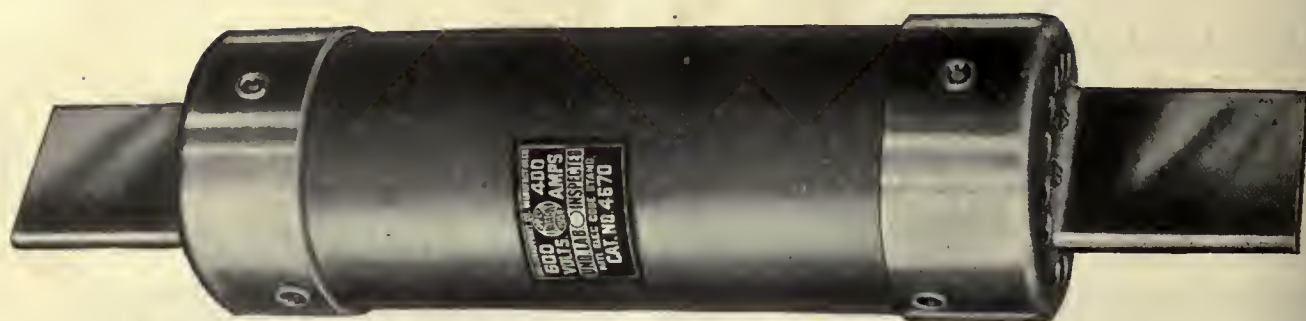
In addition to their recognized position in the railway field, they can advantageously replace rotating equipment in Cen-

tral Station distribution and industrial application, not only because of their great efficiency, but because they are noiseless in operation, cause no vibration, do not require special foundation and occupy a minimum of space.

American Brown Boveri Electric Corporation

Plants at Camden, New Jersey

Main Office: 165 Broadway, New York



Maintain Schedules

(Noark 600 Volt Fuses Carry FULL Rated Load)

Protect Motors

Use

Noark 600 Volt Fuses

they

“Blow on the Dot”

Not too soon ● Not too late

The Johns~Pratt Company

Division of Colt's Patent Fire Arms Mfg. Co.

New York
Boston

Hartford, Conn.

Chicago
San Francisco



Noark Fuses
"Blow on the Dot"



Noark Fuse
Clips and Buses



Noark
Service Boxes



Noark Under-
ground Boxes



Noark Meter &
Service Systems



Noark Railway
and Mine Material



J.P. Molding Service
on Contract Basis



Vulcanization Packing
and Pump Valves



J.P. Molded Auto
and Radio Parts





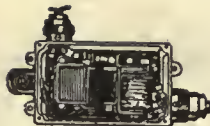
Generator



Starting Motor



Magnetic Switch



Voltage Regulator

Specifications —

ELECTRICAL EQUIPMENT

MECHANICAL

Leece-Neville Voltage Regulation
John Lee

Specify LEECE-NEVILLE Voltage Regulation Easily fitted to practically all chassis without change

Very probably the buses you order will have Leece-Neville Voltage Regulation as standard equipment. Such famous chassis manufacturers as White, Brockway, Rehburger, Schacht, Guilder, Commerce, Autocar, Larrabee-Deyo, Wilcox, Edwards, Brill and Oneida have already included it in their specifications. Otherwise,

make sure of Leece-Neville advantages by specifying it on your order. Our service stations are stocked for immediate delivery of equipments for Continental, Wisconsin, Buda and Waukesha Motored Buses. No changes are necessary. Installations can be made quickly and easily without interfering with your delivery dates.

Write now for our Booklet.

These are the demonstrated advantages of Voltage Regulation

The battery cannot be over-charged.

The battery is charged only at the correct rate for its condition.

The battery will go longer without refilling with water.

The life of the battery is greatly prolonged.

The lights can be operated direct from the generator when the engine is running.

Loose or corroded battery connections will not cause the lamp bulbs to burn out due to a rise in voltage.

It is the most economically operated generating system for motor bus use.

THE LEECE-NEVILLE COMPANY
CLEVELAND, OHIO



LEECE-NEVILLE

VOLTAGE REGULATION



Eight Years Ago



Photo when Dayton Ties were being installed in 1917.

The cost
of the
little in
of its

The eight years of traffic—much of it interurban—have failed to leave their mark upon this track.

Dayton Tie construction has again proven its worth. The wood block and resilient asphalt cushion have absorbed and deadened the vibration and blows of traffic that would have caused disintegration of the foundation.

The excellent condition of the track, even at the joints, where wear usually starts, is the result.



The Dayton Mechanical
DAYTON

~~~ and Today

ition
ack is
cation
ge.



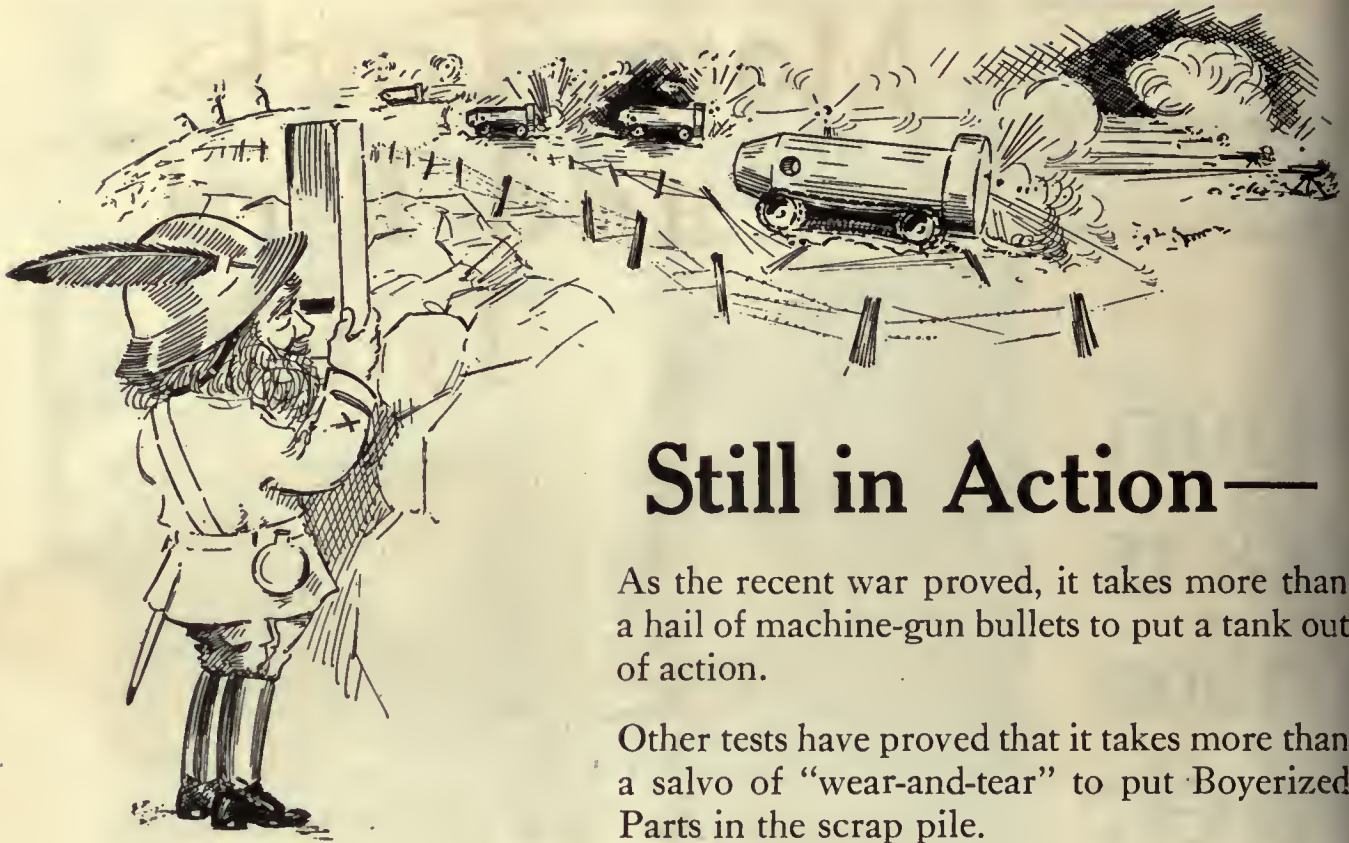
Details of design and construction and cost data will be furnished upon request.

Dayton Resilient Ties were installed upon this section of the Dayton, Springfield & Xenia Southern Railway in 1917. The above photograph was taken in 1925.

Besides showing the excellent preservation of the track and paving, it shows clearly how this section has built up recently.

DAYTON RESILIENT TIES

Tie Company ~~~
OHIO



Still in Action—

As the recent war proved, it takes more than a hail of machine-gun bullets to put a tank out of action.

Other tests have proved that it takes more than a salvo of "wear-and-tear" to put Boyerized Parts in the scrap pile.

Made of tough steel to begin with, Boyerized Parts are put through a process that gives them a glossy, glass-hard, armor-plate coating that defies the destructive elements. They last three to four times as long as the same quality of untreated steel.

Brake Pins
Brake Hangers
Brake Levers
Pedestal Gibs
Brake Fulcrums
Center Bearings
Side Bearings
Spring Post Bushings

Spring Posts
Bolster and Transom Chafing Plates
Manganese Brake Heads
Manganese Truck Parts
Bushings
Bronze Bearings
McArthur Turnbuckles

Bemis Car Truck Company

Electric Railway Supplies
Springfield, Mass.

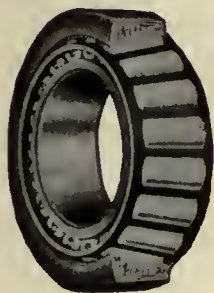
REPRESENTATIVES:

Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 54 First Street, Portland, Oregon.
J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.

It's
Boyerized



Motor Trucks and Rail Trucks

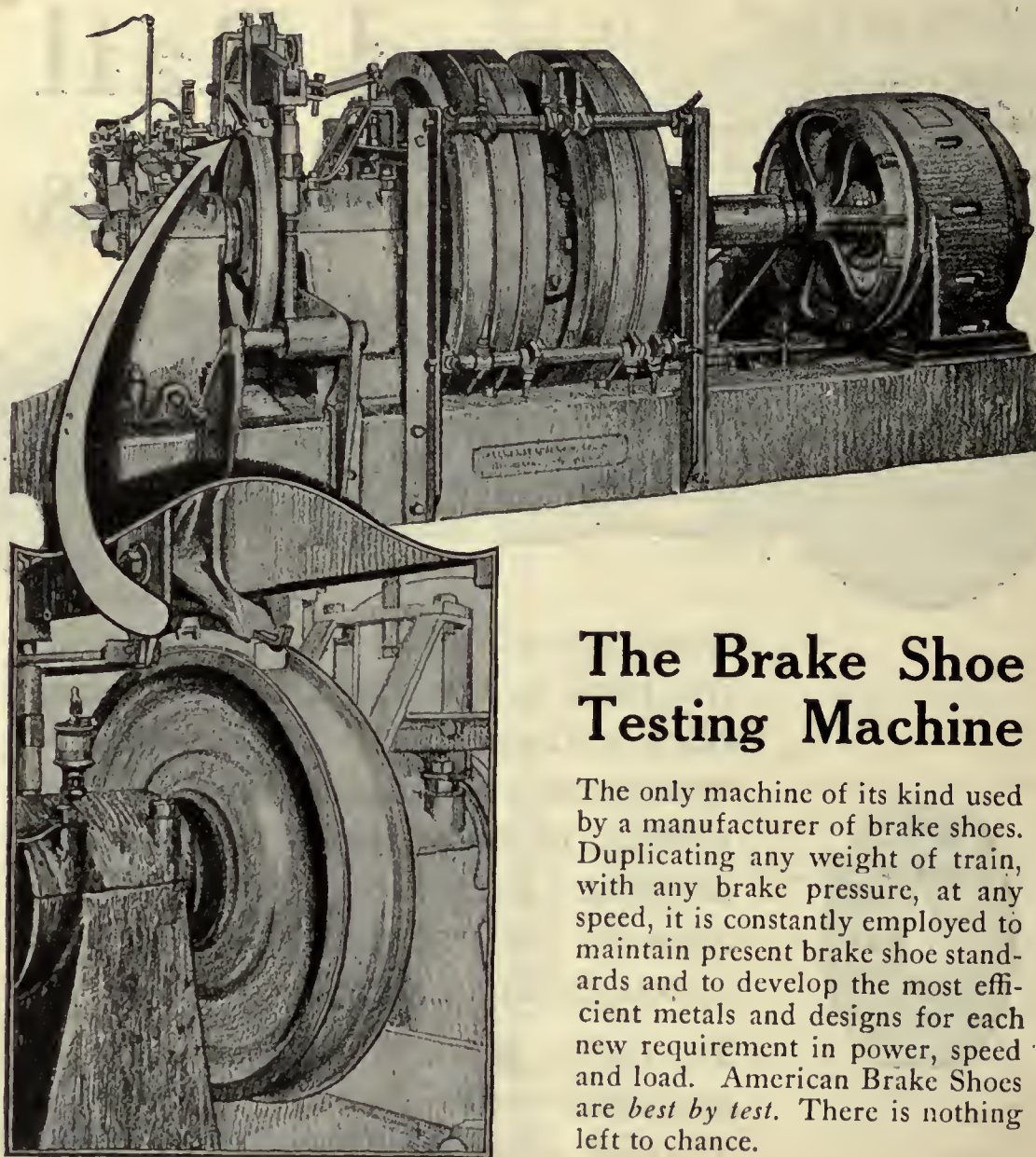


Steel pounds steel at a mile-a-minute pace in the wheel trucks of gasoline rail cars. All this shock, all the thrust of rounding steel curves, and all the huge normal radial loads are being carried by Timken Bearings in the gas cars built by the noted Brill company.

It shows what a wide margin of endurance also is built into motor trucks equipped with Timken Tapered Roller Bearings. That is why over 90% of all makes of commercial cars in this country are Timken-equipped.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

TIMKEN
Tapered
ROLLER BEARINGS



The Brake Shoe Testing Machine

The only machine of its kind used by a manufacturer of brake shoes. Duplicating any weight of train, with any brake pressure, at any speed, it is constantly employed to maintain present brake shoe standards and to develop the most efficient metals and designs for each new requirement in power, speed and load. American Brake Shoes are *best by test*. There is nothing left to chance.

**THE AMERICAN BRAKE SHOE
& FOUNDRY COMPANY**

**30 CHURCH ST., NEW YORK
332 SO. MICH. AVE., CHICAGO**

International Creosoted Ties

"The wooden tie—with reasons why!"



Quiet!

Sound-proofed Car Tracks

WOODEN ties absorb the shock and vibration of passing cars. They deaden disagreeable rumblings and subdue those clashing sounds at joints and special work.

And *International Creosoted Ties* by lasting many times longer than untreated wood, maintain the line and surface of rails, insuring the smooth, quiet running of cars.

Your Association—the A. E. R. A.—is working toward noiseless operation. We submit as a practical first step—"Sound-proof your track construction with *International Creosoted Ties*." They are cut to standard specifications, carefully graded and thoroughly treated with the highest quality creosote oil.

International Creosoting & Construction Co.

General Office—Galveston, Texas

Plants: Texarkana, Texas Beaumont, Texas
Galveston, Texas

*Prompt Shipment
from Stock to any point
in the United States*



Noted for noiselessness~

European city tractions are praised

American tourists and visiting railway men invariably remark the smooth quietness with which European electric railway cars glide along the streets.

Most of those systems have large mileage of Thermit-welded track. To a large extent it is standard practice in European cities. They have learned there, that it isn't necessary to tolerate the noise and trouble caused by loose, broken and cupped rail joints. They eliminate the joints and the noise by Thermit-welding rails.

Your A.E.R.A. Committee says—

It is the opinion of your Committee that the standard or degree of track maintenance may be blamed for the largest percentage of the objectionable and disturbing noises directly attributable to track conditions. Under this head are the following general noise-making condi-

Clipping from Report of the Committee on WAY MATTERS, Engineering Association, 1925, on their assigned subject "Reduction of Noise in Car Operation."



METAL & THERMIT CORPORATION
120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH

CHICAGO

BOSTON

SOUTH SAN FRANCISCO

TORONTO

SHORT SMOOTH STOPS

With

SIMPLEX CLASP BRAKES



REDUCE THESE TROUBLES

Hot Boxes

Train Resistance

Slid-Flat Wheels

Shocks and Hard Riding

Excessive Brake Shoe Wear

SIMPLEX CLASP BRAKES *Eliminate*

Journal Disturbances Which Cause Hot Boxes

Dragging Shoes and Stuck Brakes which cause Heavy Train Resistance and Slid-Flat Wheels.

Heavy Shoe Pressures and Unbalanced Loads on Truck Frames and Truck Springs which cause Hard Riding, Shocks, and High Brake Shoe Maintenance Costs.

AMERICAN STEEL FOUNDRIES

NEW YORK

CHICAGO

ST. LOUIS



THE ILLINOIS STEEL COMPANY makes no extravagant claims for Gary Wrought Rolled Steel Wheels in electric railway service. It merely submits that for years and years it has been a world-leader in quality steel manufacture; that all the skill, metallurgical knowledge and engineering experience gained in this long period has been incorporated into the design and manufacture of Gary Wrought Steel Wheels; and that wherever these wheels have been used, notable performance has been recorded.

If, therefore, you are not entirely satisfied with your present wheels; if perhaps they need replacing too frequently or regrounding too often; if, in a word, they don't give you the service that you think perfect wheels should give—we suggest that you investigate the records being made regularly by the Gary Wrought Steel Wheel in service similar to your own.

Illinois Steel Company

General Offices • 208 South La Salle Street
Chicago, Illinois

GARY
STEEL

WROUGHT





MODERN CARS

An essential element in your program of progress. Replace heavy, obsolete cars with light-weight, attractive rolling stock, which by increased patronage and reduced operating and maintenance cost, will soon pay off their cost. Consult our engineers who will gladly co-operate with you in designing cars to meet today's needs. Or submit your specifications for our estimate.

CUMMINGS CAR AND COACH CO.

Successors to McGuire-Cummings

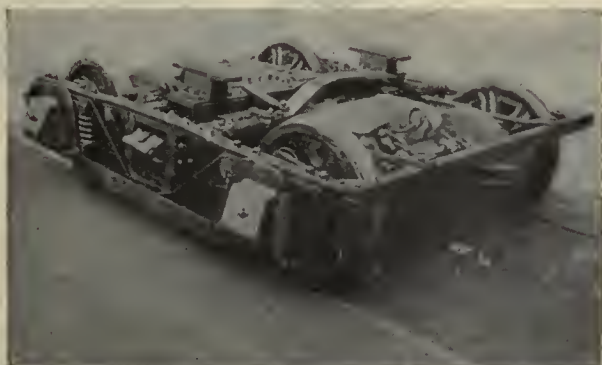
111 W. Monroe St., Chicago, Ill.

Gas-Electric Motor Coaches

Are built complete in our shops. They apply the experience gained in twenty-five years of street car building to the motor coach, embodying an attractive, rugged and comfortable body and the latest, most satisfactory form of motive power.



Type MC62 light truck, with inside hung brake equalizers, 26-inch wheels, 5-ft. 4-in. wheel base. For low car body, city service type cars.



SNOW FIGHTING EQUIPMENT

Our Snow Sweepers and Plows are in use the country over.

Annual Maintenance Number

Railways Plan to Spend \$296,000,000 for Plant and Material in 1926

Purchasing Power of the Industry Shows Healthy Progress—An Increase of 11.66 per Cent Over Last Year's Figures Is Promised—Large Track Construction Program Is Included in Forecast Submitted by the 57 Operating Companies Furnishing Information

1926

ELECTRIC RAILWAY JOURNAL

34 per Cent of Passenger Cars Are Over Twenty Years Old

Less than Half of All Cars Now in Electric Railway Service Were Purchased in the Last Fifteen Years—Greater Number of New Cars Are Needed to Modernize Industry than Was Anticipated—Nationwide Survey More than Confirms Previous Estimates

more

Track Extensions Show Substantial Gain Over Previous Years

Electric Railway Mileage Added During Past Twelve Months Is Larger than in Any Other Year Since 1918—Extensions to City and Interurban Trackage Show Increases Over 1924 — More than Twice as Much Steam Railroad Mileage Was Electrified

ELECTRIC RAILWAY JOURNAL

Bus Operation by Electric Railways Broke All Records in 1925

More Companies Inaugurated Bus Service During the Past Twelvemonth than in Any Previous Year—The Number of Buses Operated More than Doubled—Purchases of New Passenger and Service Equipment Were Greater than Ever Before

Electrification Costs and Benefits in 1925

Occurred in Major Trends Indicates Only Durin Method of Comp

Com. S. Richey
Engineer, Worcester, Mass.

ELECTRIC

vershi

Few in Receiv
e Over That
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-to be dated March 20, 1926

From the Industry's Headlines—learn a lesson!

A REMARKABLE opportunity for the manufacturers of railway equipment and supplies is revealed by the data published in the January 2nd Statistical Issue of ELECTRIC RAILWAY JOURNAL. A few of the strikingly suggestive facts are indicated in the headlines reproduced here.

The definitely-indicated movement toward modernization of rolling stock, brings with it the problems of modernizing maintenance, to the end that riders, attracted by new cars, may be retained as permanent patrons. Only by keeping cars, track and line in the pink of condition can a present-day public be kept "sold" on the electric railway as a means of transportation.

It is to the further exposition of this timely subject, that the big Annual Maintenance Number of ELECTRIC RAILWAY JOURNAL will be dedicated. The producer and distributor of electric railway equipment, supplies, maintenance materials and shop machinery, represented in this issue will derive enhanced value from ample advertising space, due to this tie-in with a timely and appropriate editorial program.

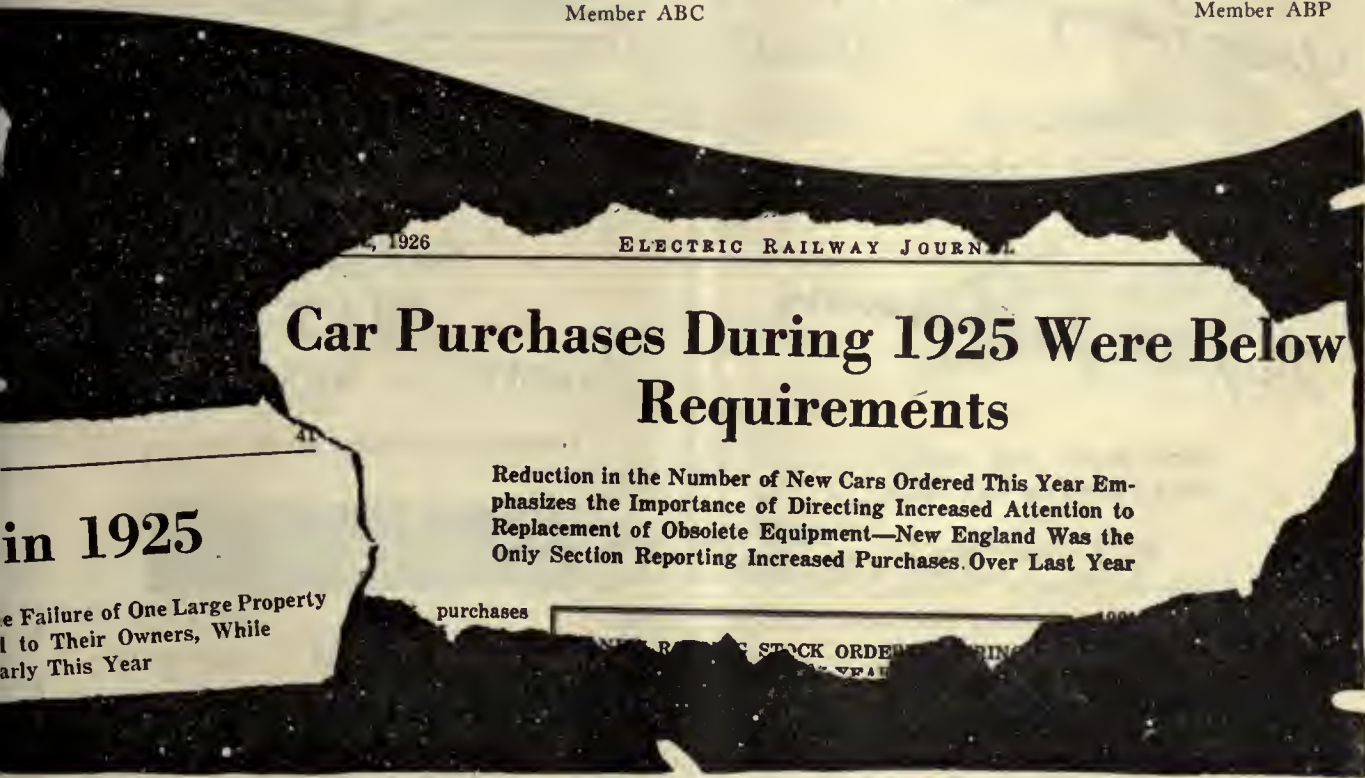
ELECTRIC RAILWAY JOURNAL

(A McGraw-Hill Publication)

Tenth Avenue at 36th Street
New York, N. Y.

Member ABC

Member ABP



1926

ELECTRIC RAILWAY JOURNAL

Car Purchases During 1925 Were Below Requirements

Reduction in the Number of New Cars Ordered This Year Emphasizes the Importance of Directing Increased Attention to Replacement of Obsolete Equipment—New England Was the Only Section Reporting Increased Purchases Over Last Year

purchases

in 1925

Failure of One Large Property
to Their Owners, While
Early This Year

STOCK ORDER



MORE-JONES TROLLEY WHEELS AND HARPS

WE MANUFACTURE various types of trolley equipment. The quality of metal, conductivity, resistance to friction, effect on overhead, shape and size of wheel groove, have all been carefully worked out and perfected. In addition to the highly specialized V-K Oilless Trolley Wheels and Harps, More-Jones make the most complete line of lubricated trolley wheels and harps to meet all requirements. Let us quote you.

More-Jones Brass & Metal Co.
St. Louis, Mo.

MORE-JONES QUALITY PRODUCTS



"Tool Steel"
helical gears
are

*Quiet on the start
and*

*Continue Quiet
because*

They don't wear.

BUY THE BEST

The Tool Steel Gear and Pinion Co.
CINCINNATI, OHIO

You're having brush trouble

CORRECT IT
USE LE CARBONE CARBON BRUSHES

They talk for themselves

COST MORE PER BRUSH
COST LESS PER CAR MILE

W. J. Jeandron
Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.

Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd.,
Montreal and Toronto



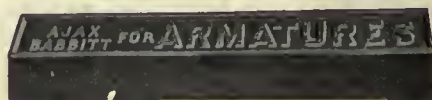
Cold Dinners

for your passengers?

Not if you use

AJAX
BABBITT for ARMATURES

keeps the rolling stock rolling



The Ajax Metal Company

Established 1880

PHILADELPHIA

NEW YORK

CHICAGO

BOSTON

CLEVELAND



Collier Service

A nation-wide
organization
building and
sustaining car
card advertising
space values



Barron G. Collier, Inc.

Candler Bldg.
New York

The DIFFERENTIAL CAR



**Standard on
60 Railways for**

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

SPECIALISTS

in the

**Design and Manufacture
of**

**Standard—Insulated—and
Compromise Rail Joints**

**The Rail Joint Company
61 Broadway, New York City**



We make a specialty of
**ELECTRIC RAILWAY
LUBRICATION**

We solicit a test of TULC
on your equipment

The Universal Lubricating Co.
Cleveland, Ohio

Chicago Representatives: Jameson-Ross Company,
Straus Bldg.

*The Hardware makes the line
Hubbard makes the
Hardware*



Hubbard and COMPANY
PITTSBURGH • OAKLAND, CAL. • CHICAGO

ELRECO TUBULAR POLES



THE "WIRE LOCK" THE REINFORCED JOINT

COMBINE

**Lowest Cost Lightest Weight
Least Maintenance Greatest Adaptability**

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO

New York City, 30 Church Street

—a manufacturer

in Newark, N. J.

—saved \$200

buying from an Indiana dealer in

—second-hand machinery

through his advertising in the

—searchlight section



*It pays
to read the Searchlight.*

*It pays
to advertise in the Searchlight.*



0058

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H. A. HEGEMAN, Vice-Pres. and Treas. F. T. SARGENT, Secretary
W. C. PETERS, Manager Sales and Engineering

National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York

Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Bell Locked Fare Box and Change
Maker
The Aluminum Field Coils
Walter Tractor Snow Plows
Cutler-Hammer Electric Heaters
Genesco Paint Oils
Garland Ventilators
Flaxlinum Insulation
Yellow Coach Mfg. Co.'s Single
and Double Deck Busses,
B. G. Spark Plugs

Economy Electric Devices Co.'s
Power Saving and Inspection
Meters
Anglo-American Varnish Co.,
Varnishes, Enamels, etc.
National Hand Holds
Ft. Pitt Spring & Mfg. Co.,
Springs
Anderson Slack Adjusters
Feasible Drop Brake Staffs
Dunham Hopper Door Devices

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley
Wheels and Harps has been
demonstrated by large and small
electric railway systems for a
period of thirty years. Being
exclusive manufacturers, with
no other lines to maintain, it is
through the high quality of our
product that we merit the large
patronage we now enjoy. With
the assurance that you pay no
premium for quality we will
appreciate your inquiries.



THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of
Water Tube Boilers
of continuing reliability

BRANCH OFFICES

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PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building



WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters
since 1898 and of Chain Grate
Stokers since 1893

BRANCH OFFICES

DETROIT, Ford Building
NEW ORLEANS, 521-5 Baronne Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

American Steel & Wire Company

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New York

Boston
Cleveland

Pittsburgh
Denver

San Francisco

U. S. Steel Products Co.
Los Angeles

Portland

Seattle

'CARNEGIE'
for
WHEELS
AXLES
RAILS
CROSS TIES



Carnegie Steel Company
PITTSBURGH, PENNA.



Special Track Work of every
description

THE BUDA COMPANY

Harvey (Suburb Chicago) Illinois

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints;
Splice Bars; Hard Center Frogs; Hard Center
Mates; Rolled Alloy Steel Crossings; Abbott and
Center Rib Base Plates; Rolled Steel Wheels and
Forged Axles; Tie Rods; Bolts; Tie Plates and
Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY

Johnstown, Pa.

Sales Offices:

Atlanta

Chicago
Philadelphia

Cleveland
Pittsburgh

New York

Pacific Coast Representative:

United States Steel Products Company
Portland San Francisco

Seattle

Export Representative:

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WHARTON

Special Trackwork
Switches-Mates-Frogs-Crossings
incorporating the famous
Tisco Manganese Steel

Wm. Wharton Jr. & Co., Inc.

Easton, Pa.

Offices

Boston Chicago El Paso Montreal New York Philadelphia
Pittsburgh Salt Lake City San Francisco Scranton

"The Standard for Rubber Insulation"

INSULATED WIRES and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

Send for Handbook

The Okonite Company

The Okonite-Callender Cable Company, Inc.

Factories, PASSAIC, N. J.

PATERSON, N. J.

Sales Offices: New York Chicago Pittsburgh St. Louis

Atlanta Birmingham San Francisco

Los Angeles

Pettingell-Andrews Co., Boston, Mass.

F. D. Lawrence Electric Co., Cincinnati, O.

Novelty Electric Co., Phila., Pa.

Canadian Representatives:

Engineering Materials Limited, Montreal.



Waterproofed Trolley Cord



Is the finest cord that science and skill can produce. Its wearing qualities are unsurpassed.

FOR POSITIVE SATISFACTION ORDER
SILVER LAKE

If you are not familiar with the quality you will be surprised at its **ENDURANCE** and **ECONOMY**.

Sold by Net Weights and Full Lengths

SILVER LAKE COMPANY

Manufacturers of bell, signal and other cords.

Newtonville, Massachusetts



AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE

TROLLEY WIRE

WEATHERPROOF WIRE
AND CABLE

PAPER INSULATED
UNDERGROUND CABLE

MAGNET WIRE

Reg. U. S. Pat. Office

Incandescent Lamp Cord

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Boston, 176 Federal; Chicago, 112 W. Adams;
Cincinnati, Traction Bldg.; New York, 166 E. 42nd St

THE WORLD'S STANDARD

"IRVINGTON"

Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.

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ANACONDA TROLLEY WIRE

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AUTOMATIC SIGNALS

Highway Crossing Bells
Headway Recorders
Flasher Relays

NACHOD SIGNAL COMPANY, INC.
LOUISVILLE, KENTUCKY.



ROEBLING

WELDING CABLE

ELECTRICAL WIRES and CABLES

John A. Roebling's Sons Company, Trenton, N. J.

Northern CEDAR POLES Western

We guarantee
all grades of poles; also any butt-treating specifications

BELL LUMBER COMPANY
Minneapolis, Minn.



Standard Underground Cable Co.

BOSTON PHILADELPHIA PITTSBURGH DETROIT
NEW YORK WASHINGTON CHICAGO ST. LOUIS SAN FRANCISCO

SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.

Made of extra quality stock firmly braided and smoothly finished.
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.

SAMSON CORDAGE WORKS, BOSTON, MASS.

NAUGLE POLES
WESTERN & NORTHERN CEDAR
NAUGLE POLE & TIE CO.
59 E. MADISON ST. CHICAGO ILL.
New York • Columbus • Kansas City • Spokane • Vancouver • Boston

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USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.
Positions Vacant and all other classifications, 8 cents a word, minimum charge \$2.00.
Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.
Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....\$4.50 an inch
4 to 7 inches.....4.30 an inch
8 to 14 inches.....4.10 an inch
Rates for larger spaces, or yearly rates, on request.
An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

**Over 6000
other men
in the
Electric
Railway
Field
will see
this page**

Then—isn't this the logical place to advertise any business wants you may have of interest to Electric Railway men?

**EMPLOYMENT
BUSINESS
or
EQUIPMENT
OPPORTUNITIES,
Etc., Etc., Etc.**

POSITIONS VACANT

WANTED foreman armature winding department immediately in Kenmore shops of The Northern Ohio Traction & Light Company, Akron, Ohio. Address: P. V. C. See, N. O. T. & L., Kenmore Shops, Kenmore, Ohio.

FOR SALE

30 Birney Safety Cars

Brill Built
West, 508 or G. E. 264 Motors. Cars Complete—Low Price—Fine Condition.

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

Attention—Buyers

FOR SALE APPROXIMATELY

4000 tons of 70 lb. ASCE first class Steel Rail and Angle Bars, 30-ft. lengths.

Approximately 1000 tons of same class of Rails, 60-ft. lengths.

ROTARY CONVERTERS

300 K.W. Westinghouse, 600 v. D.C., 6 ph., 60 cy., 1200 R.P.M. with 33,000 v. step down transformers complete with panel boards and instruments.

Bronze trolley ears, steel pole brackets, etc.

Thousands of poles and ties.

*Immediate Shipments
Get in touch with us now*

HYMAN-MICHAELS CO.

Peoples Gas Bldg., Chicago

4 High Grade! High Speed! Combination 46-Passenger (Smoking and Baggage Sections) Cars

Exceptionally good cars for Interurban Service

Every car in first-class operating condition. Built by Cincinnati Car Company. Length over all, 47 ft. 9 in. Height over trolley board, 12 ft. 6 1/2 in. Height over all, 13 ft. 1 1/2 in. Number of seats, 15 across, 4 long. Seating capacity, 46. Type of motors, four G.E.-204. Make of trucks, Standard. Wheel base, 6 ft. 6 in. Controller K-34-D. Toilet, 29 in. x 34 in. Air Compressor, WH-D-2. These cars good for one or two man operation.

Write for full particulars.

See our advertisement, on 56 passenger cars of this type, offered in this publication, January 2nd.

J. W. GERKE, Railway Equipment, 303 Fifth Ave., N. Y.



Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Christensen Air Brake Co.
Auchora, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Appraisals
Amer. Appraisal Co.
Armature Shop Tools
Elec. Service Supplies Co.

Asphalt Paint
Amer. Asphalt Paint Co.

Automatic Return Switch
Stands

Ramapo Ajax Corp.
Automatic Safety Switch
Stands

Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Illinois Steel Co.
Johnson & Co., J. R.
St. Louis Car Co.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson, J. R.

Axles, Car Wheel
Bethlehem Steel Co.

Axles (Front & Rear) Motor
Truck & Passenger Car
Timken-Detroit Axle Co.

Axles, Steel
Carnegie Steel Co.
Johnson, J. R.

Axles, Trailer & Motor Bus
Timken-Detroit Axle Co.

Babbit Metal
More Jones Brass & Metal Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co., The

Batteries, Dry
National Carbon Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
More Jones Brass & Metal Co.

St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller
Slide

Stuekl Co., A.

Bearings, Roller & Ball
Timken Roller Bearing Co.

Bells and Gongs
Brill Co., The J. G.
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
St. Louis Car Co.

Bodies, Bus
Auto Body Co.
Cummings Car & Coach Co.
Graham Bros.

Body Material, Haskelite and Plymet
Haskelite Mfg. Corp.

Bollers
Babcock & Wilcox Co.

Bolts & Nuts Track
Illinois Steel Co.

Bond Testers
American Steel & Wire Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Brake Shoes
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Brake Shoes
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

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Amer. Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

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Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

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Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

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Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

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General Electric Co.
Ohio Brass Co.

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General Electric Co.
Ohio Brass Co.

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Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

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Amer. Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Brake Shoes
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry
with Names of Manufacturers and Distributors Advertising in this Issue

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
National Carbon Co.
Westinghouse E. & M. Co.

Brushes, Graphite
National Carbon Co.

Brushes, Metal Graphite
National Carbon Co.

Bulkheads
Haskelite Mfg. Corp.

Bns Seats
Bender Body Co.
Hale-Kilburn Co.
S. Karpen & Bros.

Buses, Motor
Cummings Car & Coach Co.
Brill Co., The J. G.
Mack Trucks
St. Louis Car Co.
Studebaker Corp.
Yellow Coach Co.

Bushings, Case Hardened
and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.

Cables, (See Wires and
Cables)

Cambrie Tapes, Yellow and
Black Varnish
Irvington Varnish & Ins.
Co.

Carbon Brushes (See
Brushes, Carbon)

Carbon Paste, Welding
National Carbon Co.

Carbon Plates, Welding
National Carbon Co.

Carbon Rods, Welding
National Carbon Co.

Cars, Dump
Brill Co., J. G., The
Differential Steel Car Co.
St. Louis Car Co.

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Passenger, Freight,
Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhman Car Co., G. C.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Gas, Rail
Brill Co., J. G., The
St. Louis Car Co.

Cars, Second Hand
Electric Equipment Co.
Transit Equipment Co.

Cars, Self-Propelled
Brill Co., J. G., The
General Electric Co.

Castings, Brass Composition
of Copper
More-Jones Brass & Metal Co.

Castings, Gray Iron and
Steel
Bemis Car Truck Co.
St. Louis Car Co.
Wm. Wharton, Jr. & Co.

Castings, Malleable and
Brass
Amer. Br. Shoe & Fdy. Co.
Bemis Car Truck Co.
Horne & Ebling Corp.
St. Louis Car Co.

Catchers and Retrievers,
Trolley
Driver-Harris Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Celling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg. Co.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Clamp-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for
Wires and Cables
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.

Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.

Cleaners and Scrapers Track
(See also Snow-Flows,
Sweepers and Brooms)

Brill Co., The J. G.
Root Spring Scraper Co.
St. Louis Car Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See
Conveying and Hoisting
Machinery)

Coil Banding and Winding
Machines
Elec. Service Supplies Co.

Colla, Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.
Intern'l Register Co.
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compounds (Insulating and
Splicing)
Johns-Manville, Inc.

Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.

Concrete Flooring Surface
Irving Iron Works

Condensor Papers
Irvington Varnish & Ins.
Co.

Condensers
General Electric Co.
Westinghouse E. & M. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers
Amer. Brown Boveri Elec.
Corp.

Controllers or Parts
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
Amer. Brown Boveri Elec.
Corp.

Copper Wire
Anaconda Copper Mining
Co.

Copper Wire Instruments,
Measuring, Testing and
Recording
American Steel & Wire Co.

Cord, Bell, Trolley, Register
Brill Co., The J. G.
Elec. Service Supplies Co.
Internat'l Register Co.,
The
Roebling's Sons Co., John
A.
Samson Cordage Works
Silver Lake Co.
St. Louis Car Co.

Cord Connectors and
Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing, Frog & Switch
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing, Track (See Track,
Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Morton Mfg. Co.
Pantasote Co., Inc.
St. Louis Car Co.

Dealer's Machinery & Second
Hand Equipment
Elec. Equipment Co.
Gerke, J. W.
Hyman-Michaels

Derailing Devices (See also
Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Servise, P. Edward

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heat. Co.
General Electric Co.
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.
St. Louis Car Co.

Doors & Door Fixtures
Brill Co., The J. G.
Consolidated Car Heat. Co.
Hale-Kilburn Co.
General Electric Co.
Morton Mfg. Co.
St. Louis Car Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

Drills, Track
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.

Ears
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electrical Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.

Electric Grinders
Railway Track-work Co.
Western Electric Co.

Electric Locomotives
St. Louis Car Co.

Electrodes, Carbon
Railway Track-work Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Track-work Co.
Una Welding & Bonding Co.

Enamel
Lucas & Co., John

Engineers, Consulting, Con-
tracting and Operating
Allison & Co., J. S.
Archbold-Brady Co.
Beeler, John A.
Bibbins, Rowland J.
Buchanan & Layng Corp.
Bureau of Commercial
Economics, Inc.
Day & Zimmermann, Inc.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Keiker & DeLuw
Kelly Cooke & Co.
McClellan & Junkersfeld
Ong, Joe R.
Railway Audit & Inspec-
tion Co.
Richey, Albert S.
Sanderson & Porter
Stevens & Webster
Stone & Webster
White, Eng. Corp., The
J. G.

Engines, Gas, Oil or Steam
Westinghouse E. & M. Co.

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Johnson Fare Box Co.
Perey Mfg. Co.
Nat'l Ry. Appliance Co.

Fare Registers
Electric Service Supplies Co.
Ohmer Fare Register Co.

Fences, Woven Wire and
Fence Posts
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Consolidated Car Fender Co.
Root Spring Scraper Co.
St. Louis Car Co.

Fibre and Fibre Taping
Westinghouse E. & M. Co.

Field Colls (See Colls)

Flangeway Guards, Steel
W. S. Godwin Co., Inc.

Flashlights
National Carbon Co.

Floodlights
Elec. Service Supplies Co.

Floor, Sub
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., J. G., The

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track
Work)

Frogs, Trolley
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Funnell Castings
Wm. Wharton, Jr. & Co.,
Inc.

Furnaces, Electric
Amer. Brown Boveri Elec.
Corp.

Fuses and Fuse Boxes
Consolidated Car Heat. Co.
General Electric Co.
Westinghouse E. & M. Co.

Fuses, Cartridge, Non-Re-
fillable & High Voltage
Johns-Pratt Co.

Fuses, Cartridge, Refillable
Johns-Pratt Co.

Fuses, Refillable
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

Gas Producers
Westinghouse E. & M. Co.

Gas-Electric Cars
General Elec. Co.
Westinghouse E. & M. Co.

Gates, Car
Brill Co., The J. G.
St. Louis Car Co.

Gear Blanks
Bethlehem Steel Co.
Brill Co., J. G., The

Gear Cases
Chillingworth Mfg. Co.
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Bethlehem Steel Co.
Electric Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion
Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
Amer. Brown Boveri Elec.
Corp.
General Electric Co.
Leece Neville Co.
Westinghouse E. & M. Co.

Glider Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gong (See Bells and Gongs)

Groases (See Lubricants)

Grinders & Grinding Supplies
Metal & Thermit Corp.
Railway Track-work Co.

Grinders, Portable
Railway Track-work Co.

Grinders, Portable Electric
Railway Track-work Co.

Grinding Blocks and Wheels
Railway Track-work Co.

Guard Rail Clamps
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guard Rails, Tee Rail &
Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Elec. Service Supplies Co.
More-Jones Brass & Metal Co.

Nuttall Co., R. D.
Star Brass Works

Hale and Kilburn SEATS

Better Quality Seats
For Cars and Buses

Hale-Kilburn Co.
1800 Lehigh Ave., Philadelphia, Pa.

100 New Users in the Last Nine Months

KASS SAFETY TREADS

HIGH
in efficiency and lasting qualities

LOW
in weight, initial and upkeep costs

Morton Manufacturing Co., Chicago

**ELECTRIC CAR HEATERS
THERMOSTATS BUZZERS
PNEUMATIC DOOR OPERATORS
CONSOLIDATED CAR HEATING CO.**
NEW YORK ALBANY, N.Y. CHICAGO

**GODWIN**
Steel Paving Guards

Proven by service to economically prevent
seepage and disintegration of street railway
paving.
Write for Illustrated Catalog No. 29
W. S. GODWIN CO., Inc.
Race and McComas St., Baltimore, Md.

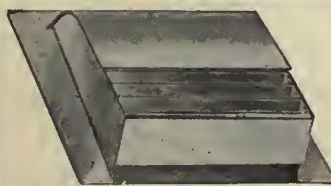
THE BEST TRUSS PLANK ELECTRIC HEATER EVER PRODUCED

**No. 478E**

GOLD CAR HEATING & LIGHTING CO., BROOKLYN, N. Y.

**CHILLINGWORTH**
One-Piece Gear Cases
Seamless—Rivetless—Light Weight
Best for Service—Durability and
Economy. Write Us.
Chillingworth Mfg. Co.
Jersey City, N. J.

**Car Heating and Ventilation**
are two of the winter problems that you must
settle without delay. We can show you how
to take care of both with one equipment.
Now is the time to get your cars ready for
next winter. Write for details.
The Peter Smith Heater Company
6209 Hamilton Ave., Detroit, Mich.

**N-L Ventilators**
for Cars and Buses

**The Nichols-Lintern Co.**
Cleveland, Ohio

PROVIDENCE H-B
FENDERS LIFE GUARDS

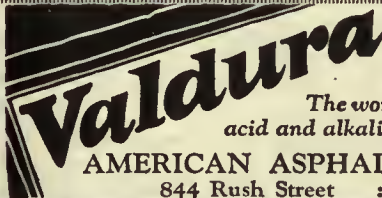
The Consolidated Car Fender Co., Providence, R. I.
Wendell & MacDuffie Co., 110 E. 42nd St., New York
General Sales Agents

RAILWAY UTILITY COMPANY
CAR COMFORT WITH
UTILITY HEATERS
REGULATORS
VENTILATORS

141-151 West 22d St.
Chicago, Ill. Write for
Catalogues 1328 Broadway
New York, N. Y.

**STUCKI**
SIDE
BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

**Valdura ASPHALT PAINT**
The world's best waterproof,
acid and alkali resisting paint.
AMERICAN ASPHALT PAINT CO
844 Rush Street :: Chicago

INDUSTRIAL GASES

OXYGEN ACETYLENE  **HYDROGEN NITROGEN**

Quick shipment and low prices also on cylinders, valves, torches,
regulators and supplies.
International Oxygen Co., Main Offices: Newark, N. J.
Branches: New York Pittsburgh Toledo

SEVEN WORKS
RAMAPO-AJAX-ELLIOT
HILLBURN, NEW YORK
NIAGARA FALLS, N.Y.
CHICAGO, ILLINOIS
EAST ST. LOUIS, ILL.
DENVER, COLORADO
SUPERIOR, WISCONSIN
NIAGARA FALLS, ONT.
CANADA

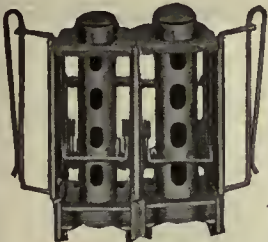
**Ramapo Ajax Corporation**
RAMAPO AUTOMATIC
RETURN SWITCH STANDS
FOR PASSING SIDINGS
TEE RAIL SPECIAL WORK
MANGANESE CONSTRUCTION
SALES OFFICES AT ALL WORKS
Main Office, HILLBURN, N. Y.

The Most Successful Men in the Electric Railway
Industry read the
ELECTRIC RAILWAY JOURNAL
Every Week

**UNA** **RAIL BONDS-RAIL JOINTS**
DYNAMOTORS
WELDING ROD
UNA Welding & Bonding Co.
Cleveland, Ohio.

- Headlights**
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.
- Headlining**
Haskelite Mfg. Corp.
Pantastote Co., Inc.
- Heaters, Car (Electric)**
Consolidated Car Heat. Co.
Gold Car Heat. & Ltg. Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter
- Heaters, Car, Hot Air and Water**
Smith Heater Co., Peter
- Helmets, Welding**
Railway Track-work Co.
Una Welding & Bonding Co.
- Ignition Units**
Leece Neville Co.
- Instruments Measuring, Testing and Recording**
General Electric Co.
Westinghouse E. & M. Co.
- Insulating Cloth, Paper and Tape**
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Stand. Underground Cable Co.
Westinghouse E. & M. Co.
- Insulating, Silk & Varnish**
Irvington Varnish & Ins. Co.
- Insulation (See also Paints)**
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.
- Insulation Slots**
Irvington Varnish & Ins. Co.
- Insulators (See also Line Materials)**
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse E. & M. Co.
- Insulator Pins**
Elec. Service Supplies Co.
Hubbard & Co.
- Interior Side Linings**
Haskelite Mfg. Corp.
- Jacks (See also Cranes, Hoists and Lifts)**
Buda Co.
Elec. Service Supplies Co.
- Joints, Rail**
(See Rail Joints)
- Journal Boxes**
Bemia Car Truck Co.
Brill Co., J. G.
St. Louis Car Co.
- Junction Boxes**
Standard Underground Cable Co.
- Lamps, Guards and Fixtures**
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
- Lamps, Arc and Incandescent (See also Headlights)**
General Electric Co.
Westinghouse E. & M. Co.
- Lamps, Signal and Marker**
Electric Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.
- Lanterns, Classification**
Nichols-Lintern Co.
- Letter Boards**
Haskelite Mfg. Corp.
- Lighting Systems**
Leece Neville Co.
- Lighting Protection**
Elec. Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Line Material (See also Brackets, Insulators, Wires, etc.)**
Archbold-Brady Co.
Electric Ry. Equipment Co.
Elec. Service Sup. Co.
General Electric Co.
Hubbard & Co.
More-Jones Brass & Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Locking Spring Boxes**
Wm. Wharton, Jr. & Co., Inc.
- Locomotives, Electric**
Amer. Brown Boveri Elec. Corp.
Cummings Car & Coach Co.
General Electric Co.
St. Louis Car Co.
Westinghouse E. & M. Co.
- Lubricating Engineers**
Universal Lubricating Co.
- Lubricants, Oil and Grease**
Universal Lubricating Co.
- Manganese Parts**
Bemia Car Truck Co.
- Manganese Steel Castings**
Wm. Wharton, Jr. & Co., Inc.
- Manganese Steel Guard Rails**
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
- Manganese Steel, Special Track Work**
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co., Inc.
- Manganese Steel Switches, Frogs & Crossings**
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
- Meters (See Instruments)**
- Motor Buses (See Buses, Motor)**
- Motors, Electric**
Amer. Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.
- Motors and Generators, Set**
Allis-Chalmers Mfg. Co.
Amer. Brown Boveri Elec. Corp.
General Electric Co.
- Motormen's Seats**
Brill Co., J. G.
Elec. Service Sup. Co.
Heywood-Wakefield Co.
St. Louis Car Co.
Wood Co., Chas. N.
- Nuts and Bolts**
Bemia Car Truck Co.
Bethlehem Steel Co.
Hubbard & Co.
- Oil (See Lubricants)**
- Omnibuses (See Buses, Motor)**
- Oxy-Acetylene (See Cutting Apparatus, Oxy-Acetylene)**
- Oxygen**
International Oxygen Co.
- Packing**
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- Paint**
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- Paints and Varnishes (Insulating)**
Electric Service Supplies Co.
Irvington Varnish & Ins. Co.
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National Ry. Appliance Co.
- Panels, Outside, Inside**
Haskelite Mfg. Corp.
- Paving Guards, Steel**
Consolidated Car Heat. Co.
W. S. Godwin Co., Inc.
- Paving Material**
Amer. Br. Shoe & Fdy. Co.
- Pickup, Trolley Wire**
Elec. Service Supplies Co.
Ohio Brass Co.
- Pinion Pullers**
Elec. Service Supplies Co.
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Ohio Brass Co.
Westinghouse Tr. Brake Co.
- Pipe Fittings**
Westinghouse Tr. Brake Co.
- Planers (See Machine Tools)**
- Plates for Tee Rail Switches**
Ramapo Ajax Corp.
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Elec. Service Sup. Co.
- Plywood, Roofs, Headlinings, Floors, Interior Panels, Bulkheads, Truss Planks**
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Hubbard & Co.
- Pole Reinforcing**
Hubbard & Co.
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- Poles, Ties, Posts, Piling & Lumber**
Bell Lumber Co.
International Creosoting & Construction Co.
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- Poles, Trolley**
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General Electric Co.
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Metal & Thermit Corp.
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Hale-Kilburn Co.
St. Louis Car Co.
- Rectifiers, Mercury**
Amer. Brown Boveri Elec. Corp.
- Registers and Fittings**
Brill Co., The J. G.
Elec. Service Supplies Co.
Intern'l Register Co., The
Ohmer Fare Register Co.
Rooke Automatic Register Co.
St. Louis Car Co.
- Reinforcement, Concrete**
Amer. Steel & Wire Co.
- Repair Shop Appliances (See also Coil Banding and Winding Machines)**
Elec. Service Supplies Co.
- Repair Work (See also Collis)**
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Elec. Service Sup. Co.
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Consolidated Car Heat. Co.
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American Steel & Wire Co.
General Electric Co.
Westinghouse E. & M. Co.
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- Sanders, Track**
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Ohio Brass Co.
St. Louis Car Co.
- Sash Fixtures, Car**
Brill Co., The J. G.
St. Louis Car Co.
- Scrapers, Track (See Cleaners and Scrapers, Track)**
- Screw Drivers, Rubber Insulated**
Elec. Service Sup. Co.
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- Switches, Track (See Track Special Work)**
- Switches and Switchboards**
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Ohio Brass Co.
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The best changer on the market. Can be adjusted by the conductor to throw out a varying number of coins, necessary to meet changes in rates of fares.

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Each barrel a separate unit, permitting the conductor to interchange the barrels to suit his personal requirements, and to facilitate the addition of extra barrels.

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Ravenswood, Chicago, Ill.



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Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

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The International Register Co.
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WHETHER you sell your transportation via motorbus or electric railway car, the Ohmer Fare Register offers the most perfect protection for the passenger, the conductor and the company.

We also manufacture the Ohmer Fare Box, the Ohmer Hub-Odometer, the Ohmer Receipt Printing Taximeter, the Atco Taximeter, the Ohmer Truck Auditor, and the Ohmer Dashodometer.

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Let us tell you of this especially designed box for this class of service.

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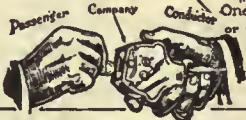
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EMPLOYERS! Consult these columns for good men.

4 cents a word. Minimum 75 cents an insertion.
0131

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Trolley Wheels & Harps Electric Service Supplies Co More-Jones Brass & Metal Co.	Truss Planks Haskellite Mfg. Corp.	Vestibule Linings Haskellite Mfg. Corp.	Welding Wire American Steel & Wire Co General Electric Co. Railway Track-work Co. Roebbling's Sons Co., J. A.	Whistles, Air General Electric Co. Ohio Brass Co. Westinghouse E. & M. Co.
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Trolley Wire Amer. Electrical Works Amer. Steel & Wire Co. Anaconda Copper Min. Co. Roebbling's Sons Co., J. A.	Turbines, Steam General Electric Co. Westinghouse E. & M. Co.	Welders, Portable Electric Ohio Brass Co. Railway Track-work Co. Una Welding & Bonding Co. Westinghouse E. & M. Co.	Wheel Guards (See Feeders and Wheel Guards)	Wires and Cables Amer. Electrical Works Amer. Steel & Wire Co. Anaconda Copper Min. Co General Electric Co. Okonite Co. Okonite-Callender Cable Co., Inc.
Trucks, Car Bemis Car & Truck Co. Brill Co., The J. G. Cummings Car & Coach Co.	Turnstiles Elec. Service Supplies Co Perey Mfg. Co., Inc.	Welders, Rail Joint Railway Track-work Co.	Wheel Presses (See Machine Tools)	Roebbling's Sons Co., J. A. Std. Underground Cable Co. Westinghouse E. & M. Co.
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			Wheels, Car, Steel & Steel Tire Illinois Steel Co.	

Going through



70 C.E.R. A. Standard Box Cars at Kuhlman

Recently there has been increased activity among interurban electric railways to augment their freight handling facilities. As a result, the Kuhlman Company is building the following C. E. R. A. Standard Trail Box Cars:

Michigan Railroad.....	15
Northern Ohio Traction & Lt. Co.....	25
Western Ohio Railway	10
Toledo, Bowling Green & Southern Ry.	10
Pennsylvania-Ohio Electric Ry.....	10
Total	70

Other companies considering increasing their freight handling equipment will recognize that much is to be gained by putting through additional cars at the same time.



THE J. G. BRILL COMPANY



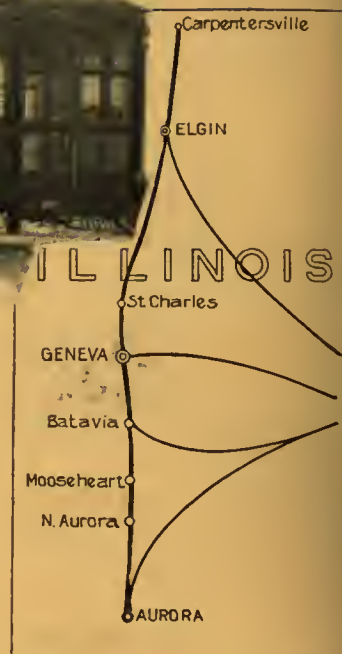
PHILADELPHIA, PA.

AMERICAN CAR CO. —
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G.C. KUHLMAN CAR CO. —
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WASON MANFG. CO.
SPRINGFIELD, MASS.

Why not take advantage of this opportunity?



More gross revenue—
Less operating expense—
Better public relations—

—All realized by the Aurora, Elgin & Fox River Electric Company

Operating costs* per car-mile, 1924

Maintenance of way and structures.....	3.29 cts.
Maintenance of equipment.....	2.55 cts.
Power.....	4.35 cts.
Conducting transportation.....	12.15 cts.
Traffic.....	.34 cts.
General and miscellaneous.....	3.93 cts.
Total.....	26.61 cts.

*Including costs of operating some heavy equipment.



General Electric equipment has been chosen for many of the recent outstanding, forward-looking car developments. It has helped to make many of the operating records which have established so conclusively the value of the modern light-weight car.

Modern Interurban Equipment

Total weight of cars.....	37,250 lb.
Motors (4-35 h.p.).....	GE-265
Control.....	G-E type K-35

How much would you profit by an increase in income resulting from an additional $\frac{1}{2}$ passenger per car-mile and by a reduction in operating costs of 4 or 5 cents per car-mile? These things are possible with modern rolling stock.

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN ALL PRINCIPAL CITIES

February 6, 1926

McGraw-Hill Company, Inc.

ELECTRIC RAILWAY JOURNAL

*Consider
These Facts!*

DURING 1925 sales of Gruss Air Springs increased 166% over those of the previous year. 10 manufacturers of trucks and buses have adopted Gruss as standard equipment. 6 others offer them as optional. Nearly 150 distributors and service stations located thruout the country are ready to give you instant service if you should need it.

Gruss Air Springs are manufactured and guaranteed by The Cleveland Pneumatic Tool Company, Cleveland, Ohio.

GRUSS AIR SPRINGS

for Trucks, Buses

Passenger Cars ~





Have You Any of the 28,000 Obsolete Cars?

**If You Have—Opportunity is
Knocking at Your Door!**

THE ELECTRIC RAILWAY JOURNAL in the January 2, 1926 issue, page 25, says:

"Purchase of more than 28,000 electric railway passenger cars is necessary in the near future if the industry is to be brought up to the high degree of efficiency necessary under present-day conditions."

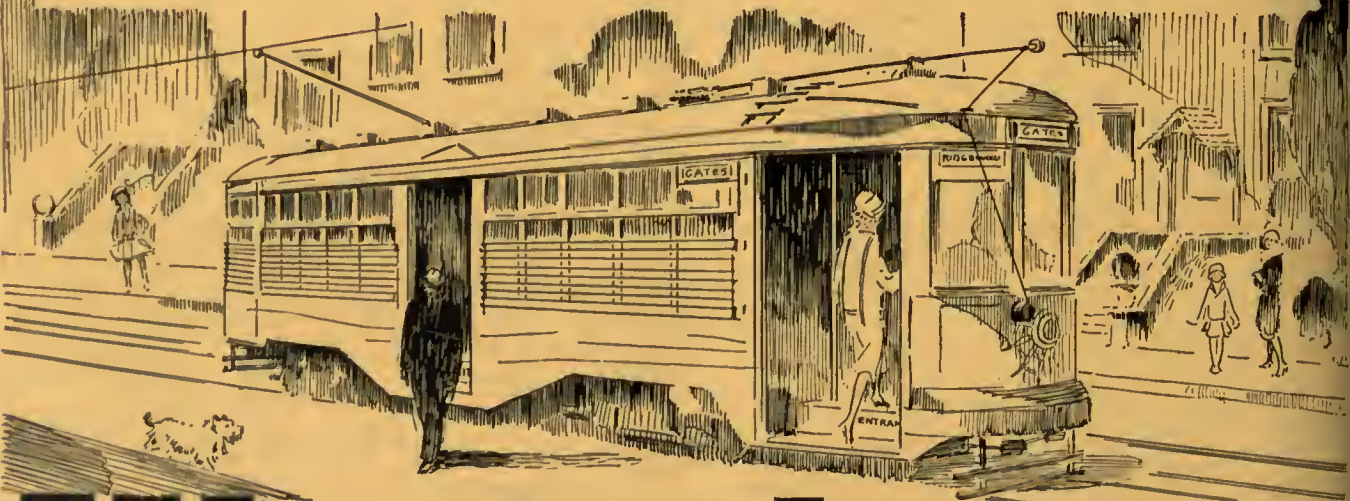
True, it isn't such an easy matter to retire these obsolete cars. There is no fairy godmother to touch them with her wand and make them into beautiful new cars, as the white mice were made into beautiful horses for Cinderella.

But the results are almost as pleasingly startling. The investment is a sound one and when stockholders and bondholders are made to realize that traffic may be increased as much as 28 per cent—an actual accomplishment on one property—at less cost per passenger, it should be possible to obtain the necessary capital.

It is no reflection on our industry that cars must eventually be retired to take advantage of new developments and economies. This has been the history of every progressive industry. (Watch for following advertisements for this story).

How many of the 28,000 obsolete cars have you?

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of
the United States and Foreign Countries



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Complete Association News

IN THIS ISSUE is published a full report of the Central Electric Railway Association meeting held Jan. 28 and 29 at Indianapolis. The program was of unusually high quality. The papers and discussion strike an inspiring note of optimism. Enthusiasm ran high in a large audience which included executives from many properties outside the C.E.R.A. territory.

Thus, in accordance with its general policy of interpreting the significance of events rather than merely recording their progress, ELECTRIC RAILWAY JOURNAL devotes liberal space to this unusual meeting.

Publishing has some of the characteristics of transportation. It is a comparatively simple matter to render a partial service. But only the agency which assumes the responsibility of rendering a complete service is fulfilling its entire obligation. By giving its readers a full record of the best thinking developed at sectional association meetings the JOURNAL makes its news service complete.

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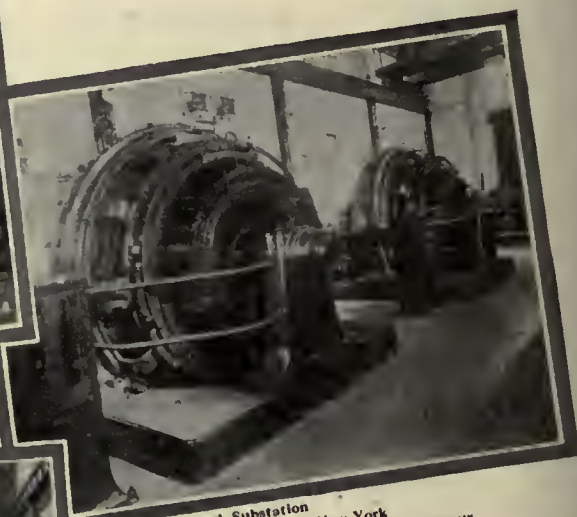
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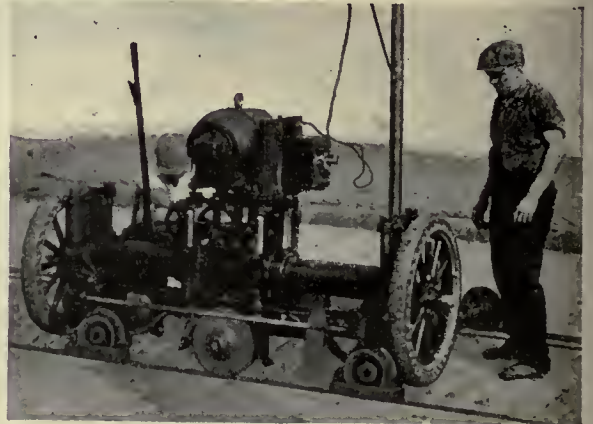
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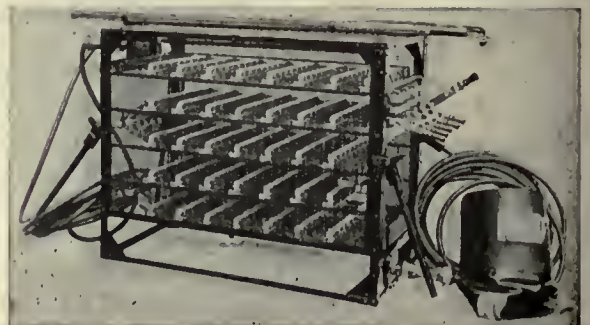
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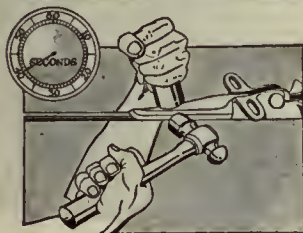
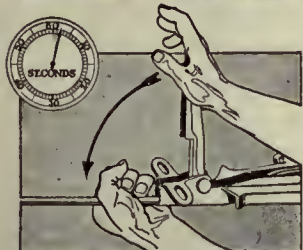
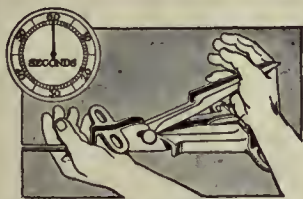


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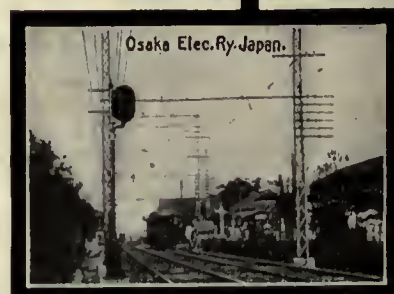


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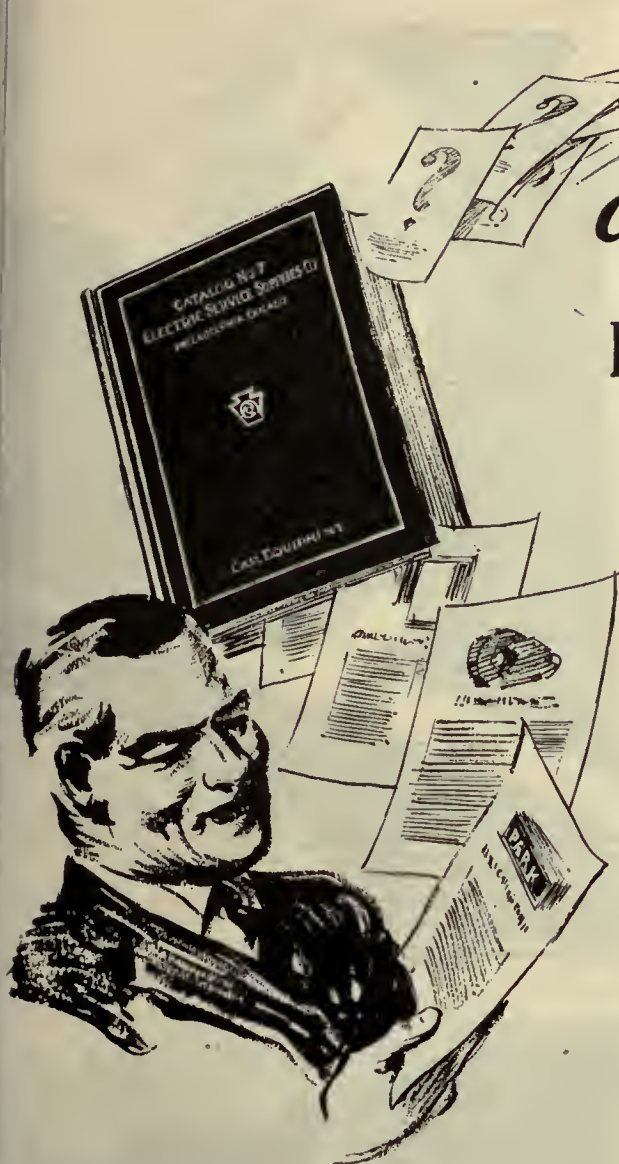
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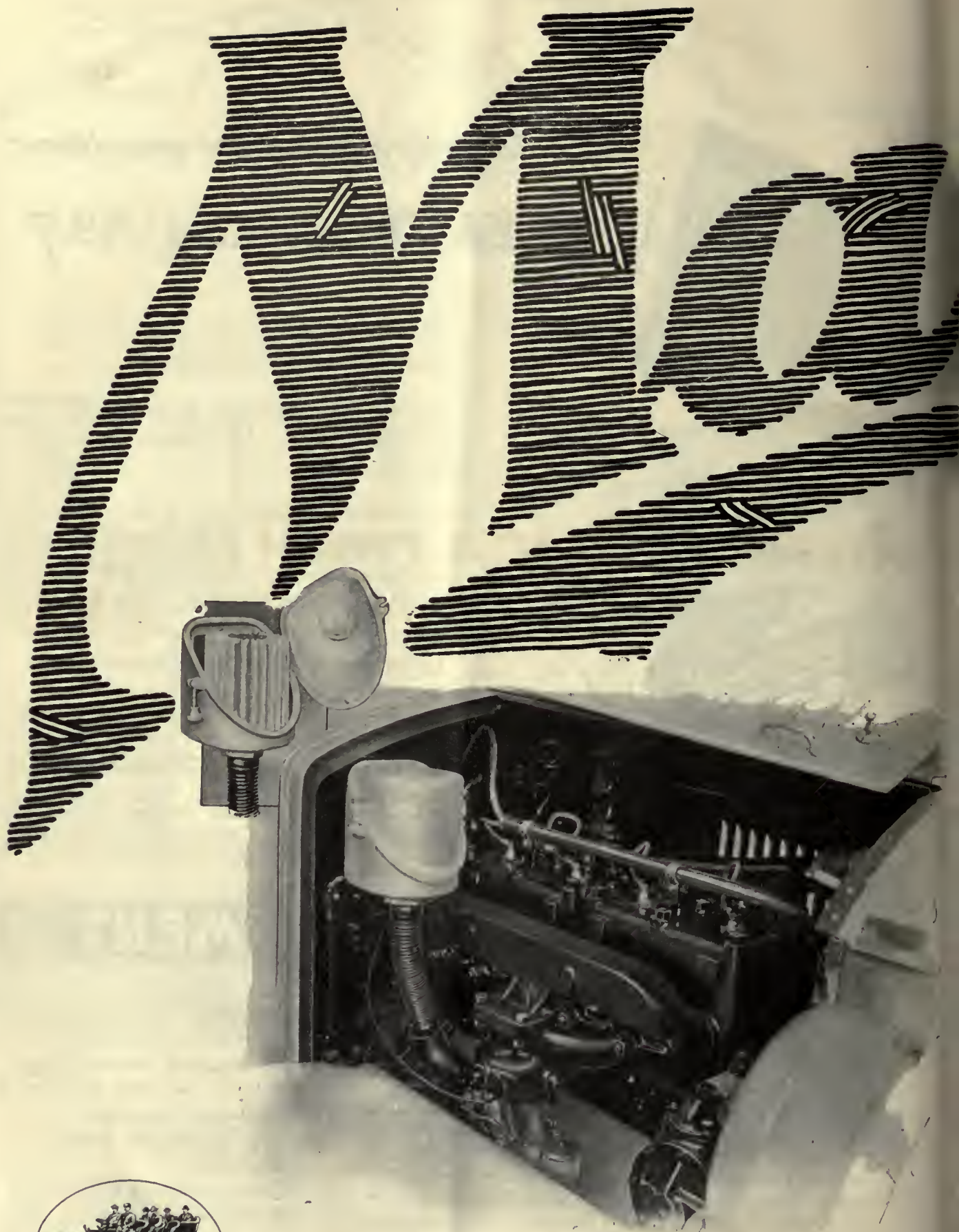
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GENERAL ELECTRIC

54C-11

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

MORRIS BUCK, *Managing Editor*

Volume 67

New York, Saturday, February 6, 1926

Number 6

Optimism Characterizes

C.E.R.A. Midwinter Meeting

NEVER has an annual meeting of the Central Electric Railway Association carried a message more clear than did the one held at Indianapolis on Jan. 28 and 29. In the addresses made by President Coates, Mr. Storrs and Mr. Budd the keynote of optimism was dominant. This was not based on hopes alone, but on facts and figures established by the industry during the past five years. In particular Mr. Budd cited examples of a dozen or more roads which have shown a material increase in operating income over a five-year period.

Progress has been made along many different lines. Physically the roads are being placed in better condition. New cars are replacing old, new track has been laid and adequate facilities have been installed. The use of one-man cars has become well-nigh universal, with not only a saving in car-mile operating expense, but an actual improvement in service. The bus has been changed from a competitor to a useful tool of the railway systems in such a way as to extend and complement the rail service.

A wholly new viewpoint has been taken by operators and holding companies as regards publicity. Once shunned, it now has become not only the usual thing, but managements are vying with one another to see which can devise the best methods and reach the largest number of patrons.

The effect has been widespread. Companies that have progressed along these lines have found it easier to get riders, easier to keep taxes and obligations within bounds and easier to finance. Perusal of the addresses and papers of the C.E.R.A. meeting will show other roads many of the methods actually adopted to make these things possible.

Change in Engineering Procedure

Should Facilitate Standardization

FAR-REACHING changes are to be anticipated by the revision of methods for voting on standards proposed by the American Electric Railway Engineering Association and approved by the American Association executive committee at its Indianapolis meeting. For years the work of standardizing dimensions of parts, materials and practices has been carried on by the Engineering Association. This has been conducted through the medium of investigation and report by committees, followed by action of the committee on standards. After this the procedure has been to present the proposals for standards before the annual convention, a vote taken by the delegates present giving acceptance or rejection. The point has been made that this procedure not only consumes the greater part of the time of the convention sessions, but does not assure

a representative vote. In fact, it is not possible to determine whether a majority of the accredited delegates present actually votes for or against the proposed standard, as a poll is rarely required.

In order to remedy this situation it is proposed to pass on standards by letter ballot of member companies. The committee reports are all printed and distributed to the membership. Each delegate should be thoroughly familiar with the subject matter, and able to vote intelligently on the proposition submitted. The result should be a higher level for the association's standards.

It was pointed out at the executive committee meeting that with the change in method of adopting standards in effect, their use by member companies and by the industry in general should be urged more than at present. There has been a disregard of standards by some prominent companies that at times has raised a serious doubt as to the advisability of continuing the work. Certainly it is a waste of time and money to ask responsible engineers to prepare standards that are not adopted generally.

Use of the letter ballot should do much to correct this situation, as an affirmative vote carries at least an implied obligation to adopt the standard. While there may be some slight inconvenience if the company standard has to be changed, this is not likely to continue for any length of time, and the benefits of having a standard for the entire industry are obvious.

Foreman Conference Demonstration

Something New in Convention Proceedings

DEMONSTRATION of an actual foreman training conference was a novelty in the program of the annual convention of the Central Electric Railway Association, held in Indianapolis last week. This brought out clearly the principles and application of one method of conducting such conferences in a way that will be long remembered by the audience, which followed every word of the foremen with keen interest. It was also convincing, because the participants were experienced foremen who showed by the way in which they took part in the discussion that they believed in what they were doing. This exhibit was staged by the committee on education of the American Electric Railway Association, with the co-operation of the Indianapolis Street Railway, the Terre Haute, Indianapolis & Eastern Traction Company and the Boston Elevated Railway. H. H. Norris of the latter company conducted the program in such a way as to emphasize the various points brought out in regular conferences of his foremen. The demonstration conference was an abbreviated session of conferences such as the Boston Elevated has been holding for the past few months.

Aside from the obvious merit of this plan for

dramatizing the recommendation of the committee on education, the "stunt" taught several important lessons. One is that the experience of foremen can be depended upon for intensely interesting and useful material for discussion. Another is that fundamental principles of foremanship can readily be proved by deduction from this material. When such analysis is based upon concrete incidents, these principles, if drawn logically from the facts presented, must be sound and must be appealing to the common sense of every thoughtful foreman.

Foreman training, by some such plan as the one illustrated, is a phase of educational work which the committee on education desires especially to stress this year. The C.E.R.A. demonstration, which followed a similar recent one by a Boston Elevated group before the New England Street Railway Club, will render more tangible the printed suggestions which the committee will distribute. The committee on management and operation, which also met in Indianapolis last week and many of whose members witnessed the demonstration, will reinforce the recommendations of the committee on education, as its regional committees carry on the work of visitation. The result cannot but be beneficial to all properties whose foremen will join in this effort to make themselves better leaders.

Where It Does Not Provide for Transportation, City Planning Must Give Way

CONSTRUCTION of a railway, whose convenience and necessity to the public have been proved, must not be held up because its construction may interfere with the interests of a few property owners. This decision was recently rendered in Wisconsin, where the question came up legally in connection with some extensions proposed by the Milwaukee Electric Railway & Light Company. There was no doubt that these extensions were justified on the grounds of the convenience and necessity of the public, but the grant was opposed by the authorities of Milwaukee County because certain parts of the route were said not entirely to fit in with the city plan adopted for one of the outlying suburbs. In consequence, an order was secured by the county from the Circuit Court requiring the commission to reconsider its permission for the proposed extensions and to hold such further proceedings as might be necessary, so that the effect on the zoning and city plan of the suburb mentioned would receive full consideration.

Fortunately, the Supreme Court of Wisconsin, before which the case came on appeal, has held that the inconvenience of individuals along the proposed right-of-way cannot affect the general subject of the need of transportation facilities by the general public. Hence, any evidence as to zoning, city planning and other similar matters of towns along the route is immaterial where the convenience and necessity of transportation are involved. Any injuries caused to the individual owners of real estate by the construction of the line, the Wisconsin Supreme Court said, can be offered in evidence for adequate compensation during the condemnation proceedings.

After all, a community cannot have the advantages of modern improvements, among which are included transportation, without their few minor disadvantages. The effect of introducing rapid transit facilities in a

community is usually vastly to increase the value of by far the greater part of the real estate. If individual owners suffer, they have their remedy in court and should not be permitted to stand in the way of blocking the benefits which will come to the majority from the construction of the line.

Idea of Celebration at Christmas Spreads Among Railways

PERHAPS there is no field of endeavor in which the electric railway has made more striking strides for betterment than in its human relations activities. Hitherto, these activities have been more or less confined to general welfare work in hospital cases, in awarding sick benefits and insurance policies as well as in establishing summer recreation camps and schools for the spiritual and intellectual stimulation of its employees.

More recently, however, as reflected in the news pages of the JOURNAL that department has become more expansive. It has founded an institution known as the Christmas Celebration, which in definite though different form is becoming part of the life of every man under railway management. This so-called Christmas spirit has been a long time finding its abode in the center of railway activity, and so worthy is the intention and so contagious the enthusiasm that ere long there will probably be no work left for the ghost of Marley to perform on Christmas Day. During the last holiday season innumerable companies entertained their employees around brilliantly decorated Christmas trees, gave presents to employees and expressed tangibly their well wishes even to employees' wives and kiddies. In some instances, the officers and employees celebrated the season by working with willing hands and anxious hearts toward making a Merry Christmas for the needy.

This taking on the Christmas spirit is one phase of the public relations work in which the personal material gains are negligible when compared with the inevitable spiritual gratification. The natural but too prevalent inward query "what shall I get out of it?" is either summarily dismissed from the mind or gradually, as the spirit takes hold of the employee, is merged into a more selfless trend of thought—"how much more of myself can I put into this scheme?" As the attitude of the company is almost sure to be reflected even in the lowliest employee and the spirit of the message transmitted by him in his dealings with the patrons, there is no telling how far reaching the benefits of the Christmas party idea will be.

Careful Analysis Will Prevent Errors of Uneconomic Bus Substitution

WHETHER or not to substitute bus service for electric railway service is sometimes a difficult question to answer. How it is done by the United Traction Company of Albany was told in a paper by E. A. Murphy presented at the midwinter meeting of the New York Electric Railway Association. Mr. Murphy gave a most astonishing indorsement of the bus in city service, saying that the popularity of buses over trolley cars is quite evident. Besides being more pleasing, Mr. Murphy stated that the transportation is quicker, safer and subject to fewer delays from traffic obstruction.

Before undertaking such a substitution earnings and reconstruction costs of a railway line are carefully surveyed. Great attention is given to consideration of the traffic that must be handled. If the substitution is made, will the smaller capacity buses successfully replace the larger capacity cars? It would be folly to make the substitution on the basis of reconstruction costs of track alone and then find in time that the traffic was too heavy to be economically handled by buses.

One method of reducing reconstruction costs of tracks that has been under consideration for many years, but has not made as much progress as could be desired, is obtaining relief from paving obligations. If this burden could be eliminated, it might change the situation in many cases of prospective changeover to buses by throwing the balance in favor of car operation.

In another paper presented at the same meeting, by William P. Capes, the suggestion was made that the New York State law relative to paving obligations be removed and the authority to determine the amount of such taxation placed on the political subdivision having immediate jurisdiction over the territory through which the individual railways pass. An upper limit of such taxation, however, would be the amounts now existing. This is a move in the right direction and indicates the tendency of the times.

That relief from such unjust taxation as that emanating from the horse-car days is bound to come is as sure as the industry itself. There were many serious errors made in early days of street car operation. Other errors of faulty substitution of buses must be guarded against just as certainly as errors arising from the failure to make bus substitution where an economic study indicates such a substitution desirable. Paving costs are so great a factor in studies of this kind that it is necessary to consider the situation from the standpoint of having obtained relief or else there may be much capital lost that might otherwise be saved.

C.E.R.A. Standard Freight Car a Service to the Industry

FOLLOWING years of talk concerning the elusive attribute of co-operation, certain members of the Central Electric Railway Association have at last proceeded to demonstrate that "a bird in the hand is worth two in the bush." In other words, they have gathered together in friendly conclave and, through the medium of their Master Mechanics' Association, formulated plans for a standardized freight car to be used in interurban service. Details of the new equipment and the plan under which it is being purchased by the several railways are published elsewhere in this issue.

Certainly such an outstanding accomplishment by any group of companies is well worthy of commendation. Advantages accruing from the use of standardized equipment are manifold. Reductions in initial outlay are not the least of these, since the manufacturers are able to produce the equipment at much less cost. Then, too, there are economies to be effected, particularly on lines that adjoin, by operating the cars jointly for through freight service. Both of these points are of considerable note. But the finest feature of the entire development is the admirable spirit of mutual accord which has marked the negotiations between the various participating parties. Every road has shown itself willing to meet the others more than half way in a

consideration of joint requirements. Needless to say, the industry has not been overly blessed with this spirit in the past, and it is the more welcome when it finally appears in so auspicious a fashion.

No little credit is due to T. A. Kenny, of Hodenpyl, Hardy & Company, whose efforts played a leading rôle in bringing the whole plan to fruition and in arranging the method of financing the purchase of cars. His assistance has been warmly appreciated by the interested companies.

Because of the widespread influence which this development undoubtedly will exercise, its value may extend throughout the entire industry. The work of standardization may well be carried further. Of course it would not be advisable for every company to standardize with every other road so far as the external design of passenger equipment is concerned. Individuality here is productive of appreciable returns and is a real asset to be cultivated. But in many items of passenger, as well as freight, equipment standardization can be carried out with excellent results.

Necessity for Co-ordination

Shown by Indiana Bus Failure

COLLAPSE of the grandiose scheme of Ward B. Hiner to control intercity transportation in Indiana was referred to by Managing Director Storrs in his Indianapolis address as a demonstration for the need of greater care in analyzing the possibilities of competitive operation.

In this case the promoter, who controlled the Indiana Red Ball Lines, Inc., attempted to conduct an intercity bus system on a huge scale, not only in direct competition with interurban railways but with independent bus operators who would not meet his terms. The opportunity presented itself on account of lack of any regulation of bus operation on highways in the State of Indiana, a condition which since has been corrected. This operator failed to recognize the fundamental economic principle that business cannot be conducted indefinitely at a loss. His idea of the function of the bus was a mistaken one. Rate of fare seemed to be the sole appeal offered by his service. Mr. Hiner's vision seems to have been limited to seeing the existing passengers on the interurban cars as prospective riders for his buses.

Co-ordination on a single route may be effected in two ways: First, alternation of schedules of cars and buses, in which service and rate of fare are quite similar, but in which unnecessary duplication is avoided. This amounts virtually to a shortening of headways. Second, the bus may be used to give an entirely distinctive service at a distinctive rate of fare. This may contemplate the use of buses to give a de luxe express service, while normal service is given on the cars; or local transportation may be given by buses, while the cars are utilized for the high-grade service.

That there is a demand for bus service in this territory is indicated by the experience of the interurban roads, which themselves are operating vehicles on the highways. With the enormous growth in riding created by the automobile Mr. Hiner's attempt to win the interurban passengers by cutting fares rather than to obtain riders from automobile owners by rendering a service that would be attractive to them was the primary cause of his failure.

Mr. Storrs' Daily Dozen for Electric Railways

1 *Exercise Our Eyesight.* Look around and see what the conditions really are. Accept the situation and whether there is hope for increased business in our respective territories or no hope, let us see it clearly and know the truth.

2 *Exercise Our Imagination.* Let us view the future hopefully and ascertain what it holds for us. The days of trailing in the local transportation business are gone. We must lead, we must have vision, we must keep a jump or two ahead of our communities if we are going to prosper.

3 *Exercise Our Faith.* We must have faith in our employees and cause a like faith in them for us. Managements and men must work together. If mutual faith does not exist, personnel should be changed to bring it about. It is unfair to ourselves, unfair to our employees and unfair to the public to have inharmonious relations existing on our properties.

4 *Exercise a Fidelity to Our Traveling Public.* This industry cannot prosper if we lack the confidence of our customers. If any among us doubt this, let us first look honestly within and see if we cannot discern some reason for their lack of faith in us. If we are then convinced that the fault is not our own, let us go frankly to the car riders and tell them where and how we think they are wrong. They usually will be fair.

5 *Exercise Our Hearing.* Do we know as much as we should what the people are saying about our service? Pleased riders are our greatest assets. Let us find out what they want by listening to what they have to say and then give them what they need and should have as nearly as we can.

6 *Exercise Our Gift of Speech.* We are behind other industries in telling our story. Fortunately we are improving in this respect, but we should talk more. Let us, when opportunity offers, tell to individuals, to groups of half dozens, or to crowds of thousands, our point of view. One spoken word is worth a hundred printed ones.

7 *Exercise Our Legs.* Legs as a means of locomotion are going too much out of style the world over in recent years. In our business we use our own too little. Entirely too many electric railway officials depend on their motor cars and permit their employees to do likewise. We cannot inspire others to use our services if we don't use street cars ourselves. A rule that none in our employ, including executives, shall use automobiles for business purposes, save in exceptional or necessary cases, might not be a bad one.

8 *Backbone Exercise.* It is needless to tell the benefits of a firm, strong and stiff backbone. It means courage, grit, poise, balance, and all these cannot help but result in an alert vigilance.

9 *The Open Mind Exercise.* Let us not say that a thing cannot be done unless we are sure. Even if we are reasonably sure that it cannot be done let us think it over carefully before giving our decision. Sometimes we may find that the seemingly impossible request can be granted or compromised if given fuller and more thorough consideration. If it proves impossible a careful study of the request ought and usually will convince its maker that we have granted him every consideration. We do not want a reputation as a consistent "no" industry. A good way to avoid such a reputation is to render decisions affecting public relations only after slow and very careful deliberation.

10 *Exercise Cheerfulness.* For many years I fear our industry had a reputation for lack of consideration of public welfare. In recent years this attitude has changed. People come to us with the feeling that they will receive a cordial and friendly reception. Nothing will do more to foster it than a cheerful attitude in our relations to the public.

11 *A Bending Exercise.* Probably few single exercises are better for our own health and the health of the industry than this one. Especially if we bend over sufficiently to understand the other man's viewpoint. It is a splendid thing for the circulation. It will make us all feel better and add to our business, and if it limbers us to the extent of losing some old worthless ideas and acquiring some new ones the benefit is assured.

12 *Exercise of Our Chests.* The twelfth and last exercise I have to recommend is perhaps as important as any. It is that of expanding our chest privately and publicly. A great deal has been said about encouraging our employees to recognize the romance and possibilities of the electric railway business. We cannot expect them to romance about our business, however, unless we feel and show pride in it ourselves. Too many street railway men have for too long adopted a limp attitude and have hesitated to boast about what their industry means locally and nationally. I firmly believe that if we had indulged in more industrial chest expansion in past years we would be in a better situation than we are today. Ours is an essential industry. Without it communities could but poorly exist. We have splendid reasons for throwing out our chests and showing that we have pride, faith and hope in our great industry. Let us do it.

A Daily Dozen for Electric Railways*

Results of Constructive Work of the Leaders of the Industry Are Beginning to Be Felt—Bus Problem, Taxation and Financing Are Improving—A Series of "Exercises" for Electric Railways Is Proposed

By Lucius S. Storrs

Managing Director American Electric Railway Association

DURING this past year much constructive effort which is beginning to show results has been put forward by leaders of the industry, and particularly by members of the Advisory Council. My endeavor will be to present briefly a picture of the high points of the present conditions and possibly indicate the trend of affairs in local transportation throughout the United States.

This morning a most encouraging address by Mr. Budd must have proved to you without any question that there is a very marked and general financial improvement throughout the country. Mr. Budd's address should be read by everyone engaged in our industry; it is not only a message of optimism, but indicates so clearly the essential soundness of our industry and the underlying factors that are necessary to the success of any electric railway property, from one who is best qualified to speak with knowledge and understanding.

Summarized, conditions within our industry which are dependent in part on the influence of outsiders, such as city, state and national regulatory bodies, car riders, bankers and others, are improving steadily. By such conditions are meant rates of fare, jitney and bus regulation, paving relief, financing and collateral matters. Improvement has not been so marked in conditions over which the industry itself should have major control. By that I mean principally the increase of freight and passenger traffic. I am thoroughly convinced that as a whole we are depending too much on the natural trend of the business to bring an increase in traffic. We could do more than we have.

This is, of course, only a generalization. It is utterly impossible for anyone to summarize the national and local transportation business in a way that will fit every local condition equally. We can only say that business is better or worse than it was during a preceding year, speaking in general terms. For instance, during the last five months, passenger traffic in every geographical section of the United States, except New England, has increased. The upward move started in July and has continued uninterruptedly since. The high point was reached in November, with 3 per cent more passengers than were carried in November of the preceding year.

The point I wish to emphasize, however, is that merely because business is better in a general way throughout the industry, it does not necessarily follow that business is better on every line. There are small and unfortunate properties on which business is not increasing. Probably there are some on which it never will increase. There is a point which we should not forget in any of our considerations; that is, the initial requisite to the success of an electric railway is sufficient population to warrant the giving of electric rail-

way service. We have heard a great deal in recent years about abandonment of electric railway properties. These abandonments have been expressed in miles, number of cars and in other ways by persons whose selfish interests were best served by giving publicity to such abandonments. But the fact that most of them were in communities where electric rail lines should never have been laid has been ignored. Most of them have been in sparsely settled communities. Of course, the best managements in the world could not have made such lines pay. There still are other lines in the same situation in this country. If there are not enough riders or enough trade to indicate profitable operation, it is futile for any management to make the effort. Just how many potential riders or tons of freight should be in sight in each case it is impossible for one to say, but any keen operator can tell in a general way what the prospects in each individual case must be. I am strongly in favor of modernization, progressive management and intensive effort, but all of them are useless unless the property to be operated is in a territory that gives reasonable promise of support.

THE BUS PROBLEM APPROACHES SOLUTION

Solution of the bus problem is slowly but surely coming about. You of the Middle West realize this possibility better than anyone else, because here you have had so many striking examples of the truth about bus operation. It has been demonstrated beyond all doubt, here in Indiana particularly, that bus rides cannot be furnished as cheaply as rides on electric rails and also that buses, which have a definite place in co-ordinated service, have been used as tools of promoters whose chief interest was the sale of securities and not the improvement of local transportation.

You are all familiar with the details of the failure of the Indiana independent bus operation, but it is such a clear example of what is going on in a similar way in a few other parts of the country that it may be worth a passing reference. Attempts were made within the last year to create in Indiana one of the greatest single independent bus operations in the United States. A huge bus terminal was built here in Indianapolis by subscription chiefly from merchants near that location and 75 or more buses operated into this terminal from about 100 Indiana communities. The promoter of the enterprise declared vehemently that buses could be operated at either 1 or 1½ cents per mile over the Indiana highways and made to return a 20 per cent profit to the operating companies. The inference left by this statement, of course, was that interurban railways charging 3 cents per mile and steam railways 3.6 cents per mile were robbing the public. The terminal was opened last May and on Dec. 21, some seven months later, the company went into the hands of receivers.

*Abstract of an address before the Central Electric Railway Association, Indianapolis, Ind., Jan. 28-29, 1926.

Coincidentally, Fred I. Jones, receiver for two of the companies, declared that "operation has been on a losing basis since its inception." One of his first steps after taking charge of the companies was to suspend 31 of the lines and to apply for a rate similar to that charged by the steam and electric lines.

Fortunately the promoter did not spread his stock very widely among citizens of Indiana. The losses, in the main, it is understood, were absorbed by a high corporation which backed him.

It is probable that out of this independent bus line experiment will come much good. It will be helpful in warning the public against buying stock in wildcat bus propositions. It will be a lesson to manufacturers who are willing to finance unwarranted competitive transportation systems, and it will protect electric railway properties which are rendering good service against unfair competition.

CREDIT SITUATION IMPROVING

Full or even partial rehabilitation of our industry will not have been accomplished until its credit has been restored. In this respect there is a marked improvement. Bankers are no longer refusing to lend money to electric railways. Their attitude generally is that they are willing to help finance companies operating in territory that seems to promise business development, progressive management with modern ideas and up-to-date methods and equipment, and public relations views of 1926 models. Any company measuring up to these requirements may approach financial houses with every measure of assurance that their applications will receive respectful consideration.

Modernization of equipment has received much discussion recently at the hands of our leaders, manufacturers, industrial publications and others. An erroneous impression that the association was advocating the junking of one-half of all cars in service has arisen. This should be corrected. It is true that modern equipment is necessary to the development of new business, but it is not true that a line to be modernized must junk all its equipment of a certain age. New cars are preferable to old, of course, and it is hoped that the manufacturers will be able to produce such satisfactory designs that there will be an added impetus to equipment purchases. This does not mean that all cars which have been in service a certain number of years must be discarded. All that the industry can hope to accomplish is to bring equipment up to a higher standard and to reassign all rolling stock to the proper service.

The reason which impelled our original suggestion for careful consideration of this matter was the hope that a different and more aggressive presentation of the advantages of the newer types of rolling stock would be made by the car building branch of the industry. There is no question but that results are being accomplished along this line. The work of the manufacturers' committee is really having the effect that was desired, and the future development of the idea can well be left to its efforts. And right here let me say that I want to express to the manufacturing group of our industry my sincere appreciation of the support and backing which it is evincing in my new undertaking.

The national tax situation presents a field worthy of the close attention of every management. As you doubtless know, our industry is paying the highest tax rate of any comparable to its size in the nation. Approximately one-tenth of our entire gross income is

being paid out in national, state and local taxation. We are carrying this enormous burden in great part because in the past we have not emphasized with sufficient insistence the inequity of this heavy charge upon the users of so essential a public service as ours. One of the activities of the past year has been to get part of the story of our tax situation recognized by national and state legislators as well as the public. Only a start has been made along this line and much more must be done. Local companies can be of the greatest assistance in carrying out this work and not only help the industry nationally, but themselves locally.

Despite the general inclination of tax-levying bodies to impose taxes on public utilities, there is scarcely one in the country that will not recognize the right of electric railways to relief when the facts are clearly stated. The individual companies have been woefully negligent in working with public officials on the tax problem.

One of the heaviest single burdens that the industry is carrying is the series of special imposts, including the paving charges. Imposition of this tax began half a century ago, but no relief from it was afforded any company until 1909; then the Cleveland Railway was given help. A ten-year interval without further relief for a single company followed, largely because companies did not make their situation known to the public and law-making bodies. However, in the last six years, owing to the increased willingness of companies forcefully to present this problem to the public, paving tax relief has been afforded in several states and about 50 scattering communities. There are few cases on record where relief has been refused after a full presentation of the true situation.

We cannot expect law-levying bodies to assist us if we do not help them by making clear to the people who elect them that the legislators in relieving us of taxes are only doing the fair thing for the public, which, of course, in the final analysis pays the charge.

Now let us pass from the situations in which the public has a hand and examine ourselves and our industry from the inside. Let us try to help ourselves.

THE INDUSTRY HAS MEANS FOR SELF-HELP

A favorite expression in recent years has been the "sick local transportation industry." And because many believed it was sick they have looked about for a cure-all. Many so called cure-alls have been offered. Some have been helpful. More have not. But no one cure has been found. I am one of those who do not believe much in medicine. Perhaps because I had for a great many years as a near neighbor, dear friend and adviser the late Walter Camp, who, with his famous daily dozen and his doctrine of exercise, has, I think, done more than any other one man to improve the health of this generation, I became a believer in exercise rather than drugs. Physical ailments often respond more readily and effectively to exercise than to pills and doses.

In the same way I believe this industry of ours has needed and now needs more exercise and less dope. And believing this, I am suggesting a daily dozen for electric railway managements, which, if adopted and followed faithfully, will, I believe, go far in helping to bring our industry back to a healthy, normal state. They are very simple exercises and any management, whether prosperous or poverty stricken, can practice them. In fact, many companies have already adopted them to a certain extent and are finding the results most advantageous.

Electric Railways Have Entered a New Era*

That Unlimited Possibilities Are Ahead Is Shown by Progress of Past Five Years—Regulatory Bodies Are Understanding the Problem, Fares Are Being Adjusted and Riding Has Increased—New Financing Has Permitted Physical Improvements

By Britton I. Budd

President Chicago Rapid Transit Company, Chicago, North Shore & Milwaukee Railroad and Chicago, South Shore & South Bend Railroad

MAKING a recovery that is almost without a parallel in American business, the electric railway industry has definitely entered a new era. There is evidence of this on every hand. It is clear to every executive who is engaged in electric railway transportation. We are in an epoch in which the possibilities are unlimited, one which challenges the courage and imagination and one which will bring prosperity to those with vision clear enough to see into the future and adjust themselves to the new and changed conditions.

In the comparatively short period since the close of the World War we have witnessed a virtual rebirth of the electric railway industry. It has become a transportation industry, embracing all forms of transit other than steam. We have seen a marked rebound from the hostility aroused through the necessary adjustment of fares to meet the vastly higher labor and other costs of producing transportation, this being expressed not only in the voiced attitude but in the wider use of electric railway facilities by the public.

We find state and municipal regulatory authorities acting with greater understanding of our problems. Very rapidly the economic absurdities written into franchises—unwitting impossibilities as respects performance either on the part of the railways or municipal officials; neither could possibly have foreseen the revolution that has come in transportation—are being wiped out. Both municipal officials and railways have found that what the people want is service; not slickly drawn contracts, which within a comparatively short time, because of the rapid change in methods of transportation and the necessities of the public, can have little or no meaning.

SINCE THE CLOSE of the World War we have witnessed a virtual rebirth of the electric railway industry. It has become a transportation industry, embracing all forms of transit other than steam.

* * *

The public expects the electric railway company . . . with its skilled organization and financial responsibility . . . to provide the entire transportation for a community, whatever the changing conditions may necessitate.

—BRITTON I. BUDD

There is no thought of fixing the price of shoes by law at \$4 a pair for 20 years, and equally so has the fixed price for transportation passed into the relic heap. There is appreciation that the fare must adequately cover the cost of production of transportation; that wages, interest, power bills, taxes and other costs are paid for, not in airy promises, but in the same kind of cash as that necessitated by other business.

No one believes horses will again pull street cars, and municipalities are rapidly wiping out the obsolete obligation on the electric railway rider of providing a racetrack for automobiles. No one believes a transportation company is going to rip up its rails, its power lines, its other properties

and quit providing communities with transportation service at the end of any fixed franchise period of 20 or 30 years. Rather the people of the communities are coming to believe, and have a right to believe, that the local transportation agency should be in a position continuously to finance itself through attractive offerings.

It is only through a constant flow of new capital into the business that the extensions of service necessitated by the public can be made, for, as is well known, fares fixed by state regulatory commissions do not comprehend that additions to properties will be made out of earnings. Electric railway new money must be obtained in the open market, where all other industries are bidding for it. There is a growing realization that the investor will go where the prospects seem brightest and that he cannot be sandbagged into parting with his savings.

The public expects the electric railway company, as an established agency, with its skilled organization and financial responsibility, to obligate itself to provide the entire transportation for a community, whatever the changing conditions may necessitate.

*Abstract of a paper presented before the Central Electric Railway Association, Indianapolis, Ind., Jan. 23-29, 1926.

Now all of the changes have not been made nationwide. But they are coming fast, becoming so universal that the time seems short when they will certainly be so. And with each progressive step forward in improving operating conditions, the public's big problem of building up adequate transportation facilities comes closer to solution.

During the period of evolution we have seen the manufacturers of electric railway equipment putting forth their best engineering skill to meet the demands for modern transportation. Obsolete equipment is rapidly going into the scrap pile. We have, in large measure, met the demand for speed and comfort in travel, combined with economy. The public has answered with increased patronage.

Is that last statement so? Possibly it would be well,

OBsolete EQUIPMENT is rapidly going into the scrap pile. We have in large measure met the demand for speed and comfort in travel, combined with economy. The public has answered with increased patronage.

Where the conditions are right it is easily proved that there is as much bonafide earning capacity in the industry today as at any time in its history.

—BRITTON I. BUDD

before we go further, to prove it, although you know of many examples. We will take some figures of companies operating in widely separated sections; communities of different sizes and characteristics, although, of course, where electric railway operation has a proper field. The accompanying table shows the gross revenue and net income of twelve electric railways for 1924 as compared with 1920. In these there has been a substantial increase in the net. Another system, the Milwaukee Electric Railway & Light Company, carried 146,208,335 revenue passengers in 1919 and 150,857,684 in 1924, its revenue in the later year being 0.0664 cent per passenger compared with 0.0550 cent in 1919. Operating revenues are not separated, as it is a combination company.

In Chicago we find both the Chicago Rapid Transit Company—the elevated railroad system—and the Chicago Surface Lines carrying the greatest number of passengers in their history. The latter, just at present, is a victim of the provisions of an antiquated franchise, but its physical properties and its financial condition were never better than now.

I can talk intimately of the Chicago, North Shore & Milwaukee Railroad—the North Shore Line—one of the companies of which I am president. In 1916, when the present management took hold, it had an investment of \$12,251,997. At the end of 1925 the investment was \$32,950,000; we have been constantly developing the property. We only recently placed an order for 20 additional combination passenger cars, three more dining cars, some refrigerator cars, and are adding materially to our motor coach fleet. We are just completing construction of the Skokie Valley route, an additional main line route, which will greatly facilitate our express speed between Chicago and Milwaukee, permit us greatly to develop our freight business and, in addition, open up a beautiful new section of country for residential

GROWTH OF OPERATING REVENUE AND GROSS INCOME FOR TWELVE ELECTRIC RAILWAYS, 1920-1924

	Operating Revenue		Gross Income	
	1920	1924	1920	1924
Boston Elevated Railway....	\$33,750,862	\$34,045,581	\$7,119,527	\$7,329,190
Chicago, Aurora & Elgin R.R.	1,760,028*	2,318,570	297,094*	544,191
Chicago, North Shore & Milwaukee Railroad.....	4,193,669	6,198,987	823,208	1,311,302
Chicago, South Bend & Northern Indiana Railway	1,249,349	1,377,515		
Cleveland Railway.....	17,382,358	17,313,549	1,408,318	1,913,993
Dallas Railway.....	3,200,392	3,325,517	319,989	693,885
Gary Street Railway.....	878,032	998,418	159,369	172,512
Indianapolis Street Railway.	5,367,936	5,588,177	790,597	1,120,073
Kansas City Railways.....	11,058,186	10,024,230	736,019	1,256,431
Los Angeles Railway.....	9,135,151	12,845,948	2,223,281	3,763,134
Pittsburgh Railways.....	21,137,223	22,063,777	2,514,459	4,409,542
San Diego Electric Company	1,379,032	1,482,832	161,897	220,356
* 1921				

purposes. Our investment in this new line will be about \$9,000,000.

The situation as regards the Chicago, South Shore & South Bend Railroad, of which I only recently became president, is interesting.

In that instance, the companies under the management of Samuel Insull and associates provide the electric light and power and gas service of practically all of the territory through which the electric carrier operates. It was believed that the electric road could be made an important factor in the development of that territory. Then, too, the right-of-way is through a section already heavily populated with industries and seems destined to become the center of steel manufacture of the world.

The road, in spite of the extraordinary territory served, had defaulted interest for many years. Immediately upon taking over the management we started re-electrification to convert it into a high-speed electrified railroad. We are providing it with the best equipment to be had, including diners and observation cars and good freight facilities. We have already increased the service, even though our improvement work, which will cost in excess of \$4,500,000, is, at this time, only about half completed. We are hopeful that the road can be brought to such a high standard as to make it a transportation agency of real service to the people.

The figures given are somewhat startling, coming from an industry that has faced a highly competitive situation from other forms of transportation. Do they prove that every electric railway company, wherever situated, however managed and however financed, is successful? Not any more than such impossible conditions could be fitted to any other business.

A million dollar department store in the Sahara Desert wouldn't get much business. Neither does an electric railway which does not start anywhere or end anywhere, which does not operate through traffic producing areas, which is not on its toes meeting competition, whose engineering is not such as makes its operation of a character that meets modern conditions, or which has a top-heavy financial structure. Such a railway has no more chance of success than any other industry loaded with corresponding burdens. But where the conditions are right, it is easily proved that there is as much bona fide earning capacity in the industry today as at any time in its history.

Discussing the statement of President Alfred of the Père Marquette Railroad, who prophesied that in the future steam railroads would be running on tracks laid on a concrete bed, at speeds rivaling aircraft, the Chicago *Tribune* said editorially:

There are three problems the railroads must face. One is the competition growing out of the increased use of automobiles and trucks. The second is the competition growing out of air transportation. The third is the

crystallizing public sentiment against the smoke and soot of the steam locomotive.

. . . Speed is the answer to the airplane; speed and the safety which it will take aircraft a long time to attain. Comfort is the answer to the airplane and automobile, comfort at 60, 70, 100 miles an hour. . . . To the threat of the automobile and the demand for clean transportation, the answer is already clear—electrification. . . . One-car units for short hauls will go far toward meeting bus and truck competition.

The change which has come about in our industry, even in the last five years, has been almost revolutionary. It has been as marked, for example, as that seen between the service given by the highly efficient American Telephone & Telegraph Company and the small rural line. In the case of the former we see the latest equipment that the world's best engineers can produce; in the latter, the old type where your number is "fourteen long rings and twelve short."

Within the last two or three years we have seen an increasing number of companies engaging in motor coach transportation as an auxiliary to railway operation. These companies have not only modernized their railway service but they have met the demand for rubber-tired transportation and shown themselves capable of serving the needs of their communities to the fullest degree.

In the interurban field we have seen some of our companies develop into high-speed, electrically operated railroads, with roadbed and equipment comparable with that of the transcontinental steam railroads. We see some of these lines handling freight and interchanging cars with the steam railroads and developing a business at once profitable to themselves and to their customers.

The adaptability of the electric railroad to this class of business has been conclusively shown. There is a demand on the part of merchants and manufacturers for the fast service which the electric railroad is capable of supplying. That is a subject to which our executives should give the closest attention, for I am convinced that there we have a wonderful field for real service.

I do not believe that any business has ever so clearly demonstrated its fundamental soundness as has the electric railway industry. Its remarkable virility and recuperative powers have been the wonder of investment bankers and investors. Its securities, which a few years ago were shunned by investors, are again taking the position in the money market which the importance and the soundness of the industry warrant.

Some of the important utility industries take pride in the fact that they went through the World War in good shape. The electric railway industry not only went through the war but through the same kind of fire for several years after the war ended and has emerged stronger and better equipped to serve the public than ever before.

"There is nothing either good or bad but thinking makes it so." Some, even yet, do not appreciate the fact that the sun is already shining upon our business, inviting them to roll up their sleeves and take advantage of the opportunities offered them. They are still weeping, but the busy world gives no sympathetic ear. They weep alone.

Some of us have always been optimistic. We have appreciated that there is \$6,000,000,000 of capital invested in electric railroads. We have believed that for mass transportation nothing has yet been devised that can take the place of the electric car running on rails, nor is there likelihood of any adequate substitute being

found. We have seen our urban population growing much faster than our rural population, which means an ever-increasing demand for electric railways. We have had faith in our industry and its future and today we are seeing our hopes and expectations realized.

When I was president of the American Electric Railway Association I preached modernization and correct financing. I said that where this was practiced, electric railways would prove good investments. I did not believe then, nor do I believe now, that the problems confronting our industry differ from those met in other kinds of business.

I believe the events of the last two or three years have fully verified my optimistic predictions.

I am ready to go a step farther today and predict that within a comparatively short time the motor coach

I PREDICT that those electric railways which are correctly financed and whose management is progressive and alive to the demands of the communities they serve have a great era of prosperity ahead of them.

This feeling of optimism which I have is shared by many others who are in close touch with recent developments in the electric railway field.

—BRITTON I. BUDD.

and all other gasoline-propelled forms of transportation now for hire by the public will be controlled by the steam and electric railroads of the country. I am satisfied that the public will demand this extension of our railroad service, if the industry itself does not take the initiative. We are in the transportation business, and it is up to us to give the public what it wants.

I predict that those electric railways which are correctly financed and whose management is progressive and alive to the demands of the communities they serve have a great era of prosperity ahead of them.

This feeling of optimism which I have is shared by many others who are in close touch with recent developments in the electric railway field.

Every executive here has felt the more sympathetic attitude of public officials and of the riding public toward our industry. The changed attitude of the regulatory authorities was well expressed by Harry G. Taylor, member of the Nebraska State Railway Commission and past-president of the National Association of Railroad and Utilities Commissioners, in his address before the annual convention of the American Electric Railway Association on Oct. 8, 1925. In printing that address *Aera* gave the paper a heading which read:

Era of Political Tinkering with Street Railways Is Closing

Demagogues Are Finding Out that Ordinances Fixing Unremunerative Fares Do Not Overthrow Economic Laws; Transportation Undergoing Readjustment and Railway Men Must Get New Viewpoint

Those are the views of a man who knows, one who has acted as a judge and impartial arbitrator. We who are in touch with the situation know that he is right. The situation has changed and the future is bright.

There may still be among us some who look upon the private automobile as a menace to our industry. But

if it has been a serious competitor, especially in the smaller communities, it has also worked indirectly in our favor. It has developed the riding habit in the people. One statistician estimates that the people of America traveled 1,703 passenger-miles per capita in 1925, compared with 618 miles in 1910. Whether this is a fair estimate or not, we all know that the riding habit is growing. The convenience of the automobile has developed that habit and it will continue to grow. The electric railway is getting and will continue to get its share of this increased riding. The share which we will get will depend on the character of the service we give the riders and how closely we will approximate the comfort and convenience of the automobile.

The automobile has educated the public in another way. It has given the public a lesson in the cost of transportation. The owner of the private automobile has found that it costs him from 10 to 20 cents a mile to supply his own transportation. He has learned that this is a heavy drain on the family exchequer. He will continue to use his automobile for pleasure riding when taking his family for a Sunday outing, but for ordinary transportation, other than business, he is finding out that it does not pay. With the experience he has had with his automobile, a 10-cent fare on the electric railway does not look as large as the old nickel fare.

In most of our large cities the automobile has almost reached the point of saturation. Reasonable speed is no longer possible on any of the heavily traveled thoroughfares. This condition is literally driving thousands back to the electric railways. Aside from the greater economy, they are learning that they can save time by using the railways in going to and from their places of business. If this trend back to the electric railway is to continue, it must be encouraged by the railways. The automobile has bred in the average American the desire for luxury in transportation. He is not as much interested in what it costs as in the character of the service. He wants to have the best that is obtainable and is willing to pay for it.

If the electric railways have transportation to sell that is fairly competitive with the automobile they will get the business, but we cannot afford to wait for it to come. We must go after it just as do other business concerns. The mere running of cars on a street or across the country will not of itself get business. This country is organized on a too highly competitive basis for that. To make a transportation company pay requires a definite selling policy. It requires the same sales effort as we see put forth by the manufacturers of "Quaker Oats," "Palmolive Soap," or any other highly advertised commodity. The selling of transportation is not an amateur's job, either. It is one which calls for experts who are highly trained and experienced in solicitation work. It takes a real live selling organization capable of meeting stiff competition.

Advertising isn't just so much space in a newspaper. It is what your advertisement says that counts, not

what it costs. We have probably as many electric railway men who think they are good advertising men as we have editors who think they could run a railway better than those who have made it their life work. If advertising does not sell what we have to offer the public, it is worthless. If a company feels it cannot afford to employ advertising experts, it will find the newspapers ready to lend their assistance.

Public relations is not a hobby. It is a thing which must be worked at and cultivated every hour of the day and every day of the week. It is not something that is confined to what is known as a "public relations" department. Every act performed by an employee who comes into contact with the public makes for good or bad public relations. Every employee who has to do with the maintenance of equipment or the upkeep of the property is making good or bad public relations, even though he may not come into actual contact with the public. His work shows, and if cars are not kept clean, windows are not washed, stations are untidy, roadbed is in bad repair, all that makes for bad public relations.

In this connection I wish to add a word about publicity. What is it? It does not mean boasting about a company or trying to make the public believe something that is not true. It means telling the public frankly and truthfully what the company and its employees are doing. We are engaged in rendering a public service; we are a quasi-public institution, and the public is entitled to know everything about this business in which it is so vitally interested. It is surprising, too, how much the public is interested in our problems. That is seen when some representative of a company speaks before a civic organization, a woman's club, a church organization, a university, college, or a public school. Such audiences are not only attentive listeners, but they propound many questions which show their eagerness to learn more about the details of our business. They are not hostile critics; they are eager to learn the facts.

This program of carrying our message direct by word of mouth to the public is one of comparatively recent development. It is one that is proving effective in developing good public relations. It is of great educational value, not only to the public, but to the representatives of the company who make such talks. It stimulates their interest in their work and in the company, because they necessarily must inform themselves on the various details before they can undertake to enlighten others.

In conclusion, I wish to emphasize my faith in the future of electric railways. I appreciate the fact that there are obstacles to surmount. But there are problems to meet and solve in every line of business. This is not peculiar to our business. Our problems are no greater than those of many other businesses, and I know that we have in the electric railway industry men who are capable of grasping the vast transportation opportunities which lie ahead and of turning them to the advantage of the public which we serve.

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Modern Cars— Not a Panacea, but an Essential Step*

Replacement of Obsolete Equipment Is a Problem of Economics—Many Examples Show That New Cars Will Pay for Themselves in Many Cases with an Improvement of Good Will—Manufacturers' Engineering Committee Is Making Economic Studies and Preparing Designs for Improved Cars

By Charles Gordon

Assistant Vice-President McGraw-Hill Company, Inc.

ACCORDING to the program, I am scheduled to talk about the economics of modern cars. Last summer I talked about their style. Any one who has a growing daughter will appreciate the logical sequence with which the program committee has carried me forward from style to economics.

But the word "economics" looks cold and uninviting in type. It tends to make you feel that the subject is heavy. You would probably skip over an article with such a head and promise yourself to read it when you get time. I shall therefore exercise the editor's prerogative of giving attention to his headline by calling my subject "Modern Cars—Not a Panacea, but an Essential Step."

Nevertheless, the subject is a matter of economics. The question is, Do new cars pay? If you will bear with me for just a moment I would like to put that another way, Do old cars pay?

There are several important factors involved in determining the answer to that question that do not appear on the account ledgers. These include, among other things, the effect of the condition of equipment on the public's attitude toward the railway; the effect on the morale of platform employees, on the regularity and speed of the service rendered and on the accident record of the property. But for the moment I wish to consider the two factors that directly affect the color of the figures on the ledger, namely, income and operating expense.

If we pride ourselves on any one thing in this industry it is the accuracy and completeness of our operating accounts. But how many properties can answer the question, "Do old cars pay?" by consulting their accounts. How many can tell from their records when the economic life of their equipment has been reached?

THERE HAS BEEN much discussion of what the proper life should be for electric railway cars. The final answer to this question is a matter of economics. Age alone is of little significance except when viewed in the light of developments in the art. Recent years have brought many improvements in cars. There is room for many more. But on the basis of actual progress that has been made in design since many existing cars were built, serious consideration should be given to their replacement. . . .

That life is most economical which at its end shows the greatest net earnings for the car.

Modern cars are not a panacea. They will not take the place of good management, but they are a part of good management. When combined with the modern merchandising viewpoint the entire status of some properties has been altered.

It so happens that an illustration I have in mind is drawn from a company operating buses in tour service. This is an old and seasoned organization. In general, bus accounting practice is still comparatively crude. But in the case of this company, which operates more than a hundred vehicles, the earnings, operating and maintenance costs for each vehicle are known at the end of the year. Its buses were purchased in groups over a period of several years. All of them are of the same type and manufacture. Each group is designated by the year of its purchase. The operating and maintenance accounts are recapitulated so as to show a comparison for the various groups. One can tell when the operating and maintenance costs on

the oldest group have become so high that the saving on new buses will show a favorable return on the money invested in them. This company scraps its old equipment on that basis. Its rates are regulated. The company uses its records as a means of establishing rates of fare that permit uneconomical equipment to be scrapped when it has served its useful life.

How many railway companies are handling the economics of cars on that basis? The life of a bus is comparatively short. For that reason, in the case of the company I mentioned, the subject of replacement is an important one, and the method of accounting in use was developed to take guesswork out of the all-important question of scrapping uneconomical equipment. The very fact that the life of electric railway cars has been considered to be almost indefinite is probably responsible for such a method of procedure not being followed generally in electric railway accounting practice. As a result, in many cases the economical life of cars has been overestimated. The factor of obsolescence has not been properly evaluated.

Here we find the basic reasons for the condition of

*Abstract of a paper presented before the Central Electric Railway Association, Indianapolis, Ind., Jan. 28-29, 1926.

electric railway equipment today. The average property cannot answer the question "Do old cars pay?" from its records; that's why there are so many of them still in service.

In the mind of the man on the street the status of the railway industry and the condition of a given property are determined by his contacts with it. To him an electric railway consists primarily of the cars and the men on the platforms.

The importance of the contacts between employees and the public is generally accepted. But the effects produced by the condition of the equipment have in many cases been overlooked. The appearance and condition of the cars have a direct influence on the attitude of the passenger toward the railway and also on the morale of the employees themselves. A man is a better, prouder and more courteous employee on the platform of a new, attractive car than when the equipment

EXPERIMENTAL AND DEVELOPMENT work is expensive. At the present time there is a lack of incentive for manufacturers to undertake such expenditures. The large variety of motors, trucks and cars that are required to meet the demands of a comparatively restricted market has been a powerful drag on development.

is old and obsolete. When a motorman takes out a new car he does so with the feeling that it is a good piece of equipment and he has some regard for the way in which it is operated. The resulting effect on passengers is obvious. In a paper some time ago W. C. Bolt of the Eastern Massachusetts Street Railway testified to the effect of new cars on the morale of maintenance men. When such a car comes into the shop the men feel that it is worth repairing.

Money spent for remodeling cars that have been in service fifteen to twenty years often merely postpones the day when up-to-date equipment can be purchased.

Leaders of thought in the industry have been convinced for some time that this subject of replacing obsolete equipment is of paramount importance. Surrounded, as we are, by other forms of transportation, where replacement proceeds at an amazing pace, the electric railways have suffered by comparison, so that, to the popular eye, they have seemed to be moving backward. The obvious method of bringing about improvement is to examine carefully into the state of affairs and then to present the results to the industry. This *ELECTRIC RAILWAY JOURNAL* has recently endeavored to do. In co-operation with the American Electric Railway Association, and with the aid of the General Electric and Westinghouse companies, which had collected considerable data on the subject, a survey of the age of electric railway cars was made and published on Jan. 2, 1926. The condition found speaks for itself. The picture is not a particularly attractive or complimentary one. Nevertheless, if we are to make progress, we cannot afford to overlook present conditions. It is far better to determine the facts and then to look for ways and means of improving the situation.

In this survey electric railway passenger cars were grouped in five-year periods: 14.2 per cent of the total

number of cars are more than 25 years old, 19.8 per cent fall in the period between twenty and 25 years, 20.5 per cent have seen from fifteen to twenty years of service. A total of 34 per cent are twenty years of age or older.

PROPER LIFE OF THE CAR AN ECONOMIC QUESTION

There has been much discussion of what the proper life should be for electric railway cars. The final answer to this question is a matter of economics. Age alone is of little significance except when viewed in the light of developments in the art. Recent years have brought many improvements in cars. There is room for many more. But on the basis of actual progress that has been made in design since many existing cars were built, serious consideration should be given to their replacement.

That life is most economical which at its end shows the greatest total net earnings for the car. In other words, a car should be disposed of just as soon as a comparison of the operating and maintenance cost and merchandising value of the old and new shows that it can profitably be replaced. The trouble has been that railways have clung to the old equipment for many years when plain economics would have shown that it should long since have been replaced simply on the basis of economics made possible by developments in the art.

The common plea has been that money could not be raised to buy new cars. In some cases that has been true. It has been repeatedly demonstrated, however, that in most instances when the railway has the will to modernize it is possible to finance new equipment on the basis of the savings in operating cost that can be shown. At least one large car builder makes the statement that no electric railway has ever defaulted on an equipment trust. An inquiry among car builders reveals that applications for the purchase of cars on equipment trusts are very rarely turned down. In most instances the builder is ready to back the judgment of the railway in financing cars on a basis under which the increased earnings and reduced expenses will return the cost of the cars.

Modern cars are needed to meet modern conditions. The car designer holds the key to public approval and increased patronage. Application of the same principles that lead a merchant to give careful thought to the appearance of his store front will attract more riders and make more friends for the railway. It is obvious that the most expensive car is the one that attracts no patronage.

There has come into car construction practice a definite attempt to provide more comfort for the passengers and to make cars both attractive and pleasing in appearance. The subjects of painting, of design to get streamline effect and to overcome stubby appearance in the smaller cars, the use of plate glass and pleasing decorations are receiving attention. Even the subject of color effects on the interior is beginning to be discussed with new interest by railway men.

It is well to note here that the bus has been brought to its present state of development by its manufacturers. As its use by electric railway companies has increased, there have been many demands for changes from the manufacturers' standard designs. If such demand lead to continuous improvements by the manufacturers it will be a healthy influence. If it leads to the breaking down of manufacturer initiative and fills his shop with many varieties of special jobs it will check orderly develop-

ment and will change what is now a manufacturing business into a contracting business, as it has done in the case of electric railway cars.

The car designer is not limited by the necessity of carrying his own power plant as is the bus man. Neither is he limited by the clearances on narrow highways. There is more room to provide facilities for boarding and alighting passengers. With a growing interest in the advantages of improved cars and under the stimulus of the expanding market which such interest will give, we may look forward to an era of rapid development and improvement in the electric rail car.

NOISE REDUCTION MAY INFLUENCE DESIGN

The subject of noise reduction is receiving much attention. Whether or not this will ultimately lead to a change from the present method of driving a car is at present difficult to foresee. Most car and truck builders feel that the simplicity of the present form of construction is an asset that should not be discarded in favor of a more complicated construction. There is, however, only limited opportunity of reducing noise under these conditions.

When the present form of construction came into general use the art of gear manufacture was in a comparatively crude state. The automobile has brought about an amazing development both in speed reduction mechanism and anti-friction bearings which permit close fits and accurate gear alignment. Little has been done toward the adaptation of such devices to street cars. Such a step involves a period of courageous development and experiment. By removing much of the present unsprung weight on the axles it offers the opportunity of materially reducing noise, and wear and tear on track.

It is the opinion of some designers that changes from the conventional design would increase the cost of maintaining equipment. Whether or not the advantages of a change from the present simple construction would outweigh the disadvantages can be determined only by experience. Although this is a matter of design, its solution is a problem in economics. Experimental and development work is expensive. At the present time there is a lack of incentive for manufacturers to undertake such expenditures. The large variety of motors, trucks and cars that are required to meet the demands of a comparatively restricted market has been a powerful drag on development.

Two constructive influences which may bring about a change in this condition are at work. A special committee of manufacturers is at present endeavoring to determine some basis for reducing the number of types and sizes of equipment. Such a simplification would greatly decrease development expense and would thereby stimulate improvement in cars and apparatus. This group of specialists, working as a committee of the American Electric Railway Association, is co-operating with the committee on unification of car design. Combined with this activity, increased appreciation of the advantages of new and improved cars will offer an additional incentive to development under the spur of competition by opening up an expanded market. Such interest is growing rapidly.

Many examples are available of the advantages which follow the replacement of obsolete equipment. Modern cars are not a panacea. They will not take the place of good management, but they are a part of good man-

agement. When combined with the modern merchandising viewpoint the entire status of some properties has been altered.

A comparatively small increase in the number of passengers carried, resulting from the attractiveness of new equipment, will show a handsome return on the investment in new cars. Savings in operating and maintenance costs per year in comparison with old and obsolete equipment have in some cases run above 20 per cent of the new-car cost. The effect on public relations has in many cases been beyond the possibility of measurement in dollars and cents.

A striking example is offered by the experience of the Buffalo & Erie Railway, operating a 92-mile line between the two cities from which it takes its name.

IT IS WELL TO NOTE here that the bus has been brought to its present state of development by its manufacturers. As its use by electric railway companies has increased, there have been many demands for changes from the manufacturers' standard designs. If such demand lead to continuous improvements by the manufacturers it will be a healthy influence. If it leads to the breaking down of manufacturer initiative and fills his shop with many varieties of special jobs it will check orderly development and will change what is now a manufacturing business into a contracting business.

This road was a losing venture from the day it was completed. It was in receivership for about nine years and its condition seemed hopeless. Its present owners thought differently. They backed their opinion with their money, and the results accomplished in the short period of a year amply justify their faith. But these results would have been impossible with the old cars. Others tried it and failed. The complete replacement of the old equipment was the starting point. That made possible many steps that followed rapidly. The results accomplished were dependent on providing a type of equipment which could compete with the automobile in speed and comfort, and at the same time would permit frequent service to be given. In the face of a severe local industrial depression on its lines that practically wiped out the short-haul industrial rider, service was increased to the extent of 16.7 per cent in car-miles over a corresponding ten-month period with the old equipment. Seat-miles were increased 33.4 per cent. The improved service attracted transients and former automobile riders for the longer hauls. Consequently, although total passengers carried decreased 14.7 per cent, the average length of ride increased, and the receipts per passenger rose 31.1 per cent. At the same time the operating expense per car-mile decreased 27.3 per cent. An increase in schedule speed of almost 10 per cent was made. For the first ten months of 1925 the net income was \$131,024.42, in comparison with \$14,335.89 for the corresponding period of the previous year.

The experience of the Lexington, Ky., property is too well known to require detailed discussion. Suffice

it here to note that at the end of the first year of operation with new equipment operating revenue increased 12.7 per cent in comparison with the previous year and operating expenses decreased 13.2 per cent, while service was increased to the extent of a 38.3 per cent increase in car-miles operated. The number of late trains was reduced 64.2 per cent. Net revenue was doubled.

Lack of time permits only a mention of some of the properties where the effect of modern cars warrants careful study by the industry. Introduction of new cars in Brooklyn, which made possible operation at higher schedule speed, while at the same time reducing power operating and maintenance costs, resulted in an increase of 28.2 per cent in the number of passengers carried on two typical lines in comparison with the same lines a year before when they were operated with old equipment. So far as the management was able to determine no fundamental changes had occurred which could account for the increased traffic other than the attractiveness of the service rendered with the new cars.

In January, 1925, the Interstate Consolidated Street Railway, operating some 30 miles of track serving the group of Massachusetts towns known collectively as "the Attleboros," was purchased out of receivership at a time when the line was faced with the possibility of shut-down and was showing an operating loss of approximately \$120 per day. Service had been rendered with a miscellaneous collection of 35 cars of various types, both closed and open. New equipment made possible savings in operating costs alone that more than justified their installation.

When service is discontinued on an electric railway, due frequently to the combination of excessive local restrictions and artificial operating burdens imposed by an uninformed public, the example is seized as an evidence of the decadence of the entire industry. Frequently such suspension of service is no indication that the electric railway in that location has outlived its usefulness under proper operating conditions. New equipment has in several instances been the means of securing very much better co-operation from the community. The New Haven & Shore Line Railway, a 34-mile interurban line running from New Haven, Conn., east along the edge of Long Island Sound, was shut down and abandoned for more than four years. In the fall of 1924 service was resumed with new equipment. During the first few months of operation passenger revenue was built up sufficiently to pay operation and interest charges and to keep the line in service.

Approximately two years ago the Ohio Valley Electric Railway at Huntington, W. Va., was operating a miscellaneous lot of rolling stock of various types, sizes and weights. It was discovered that this was costing an excessive amount for maintenance, was making a bad impression on the public and at the same time was causing rapid deterioration of expensive track construction. The property was entirely re-equipped with 40 new cars of uniform type. The resulting saving in cost and the effect on the attitude of the communities served have demonstrated the wisdom of the action taken.

The effort in Grand Rapids to popularize street car riding by providing a more attractive type of equipment has been watched by the entire industry with a great deal of interest. On the Cherry line, where the three sample cars were placed in service last summer, riding was increased an average of 7,240 passengers per month

over the corresponding period of the previous year. This was during the months of June, July and August, when automobile traffic is at its highest and when railway riding usually showed a severe drop. During the period of observation riding on the system as a whole was lower than in the previous year. During the month of August the increase on the Cherry line was 10.46 per cent. In a direct comparison of the riding on the three sample cars with the other cars on the same line, they showed 63 per cent more passengers. Part of this may be attributable to novelty. But it certainly indicates that car improvements attract the attention of the public and build riding.

We could go on with many other examples of properties on which the replacement of obsolete equipment has been followed by results that warrant careful study. This list would include a number of properties in the C. E. R. A. territory. The experience of Pittsburgh, Hannibal, Mo.; York, Pa.; the Evansville & Ohio Valley Railway, the Illinois & Fox River Electric Company, the Eastern Wisconsin and the Illinois Valley division of the Illinois Traction System are worthy of attention. On this latter line results in 1925 compared to 1923 show a saving in operating cost equal to 21 per cent of the investment in the cars and an increase in passenger revenue amounting to 17 per cent of the car cost. At the same time an hourly service was given in comparison with two-hour headways in 1923.

THE INDUSTRY ON A FIRMER FOUNDATION THAN EVER

The electric railway industry has survived through a period of serious economic and operating handicaps. It continues today, more clearly than ever before, to occupy a firm position as a fundamental basic necessity in modern community development. Among those who are in position to view conditions in broad perspective, there is a growing conviction that the industry is on the threshold of an era of renewed prosperity. The public is being gradually enlightened in several notable instances.

The last, and what seemed for a time the greatest, burden, namely, automotive competition, is in some respects not an unmitigated evil. It has not only caused a vastly increased riding habit in the form of a desire to move about more frequently but it has also brought into railway ranks a new point of view on transportation.

The chief function of a railway company is to sell rides at a profit. This purpose is accomplished only when it succeeds in rendering satisfaction to the public. It is only when the railway is furnishing a form of transportation superior to any other of equal cost and showing a tendency to improve and progress as conditions change that favorable results may be expected. Again this is a matter of economics. Success today in transportation is dependent on creating demand through improvement of the product. The blind following of precedent frequently leads to the toleration of a great many really obsolete practices. It is therefore very desirable that railway men compare the progress of their industry with that made in other lines of business and try to withdraw themselves far enough from the immediate detail problems of the moment to get a perspective of their own tools as they appear to others. Having this viewpoint, there may come the necessary inspiration and ideas for accelerated progress.

C. E. R. A. Pioneers with Standardization

Uniform Freight Trailer Equipment Has Been Designed by Master Mechanics—Nine Companies Are Planning Operation of These Cars—New Specifications for Many Features

NEVER before had a concerted attempt been made among electric railways to standardize upon freight car equipment until nine companies in the Central Electric Railway Association undertook that very thing. When it became evident that considerable new freight handling equipment would be necessary in the central area within a short time, in order to render feasible the drive for additional freight business which was about to be launched, the Master Mechanics' Association was authorized to draw up specifications for a car. The operating characteristics of the various companies were carefully analyzed, in order that the requirements of all might be served effectively by the new units.

The advantages of standardized equipment are legion and need not be tabulated. Not the least among them, of course, is the item of reduced costs of manufacture and the corresponding saving in initial outlay. Then, too, the item of maintenance is considerably diminished, since a less varied stock of replacement parts is required. In spite of these facts, however, it was noteworthy that so complete a spirit of co-operation and harmony was maintained throughout the negotiations by the various railways joining in the pool.

An important matter to decide was that of the manner in which the purchases would be financed. Through the efforts of T. A. Kenny of Hodenpyl, Hardy & Company arrangements were made with the Kuhlman Car Company under which the cars would be sold on car trust certificates which would carry a down payment of 10 per cent and equal monthly installments over a period of five years. Thus far, all of the companies which have definitely contracted with the Kuhlman company have seen fit to make use of this plan. A number of the original members of the pool are still withholding

*Note: If it proved desirable to construct the cars with round, rather than with square ends, a duplicate set of specifications was provided by the Master Mechanics' Association for the details affected.

definite action on the plan, pending more complete investigations into their individual requirements.

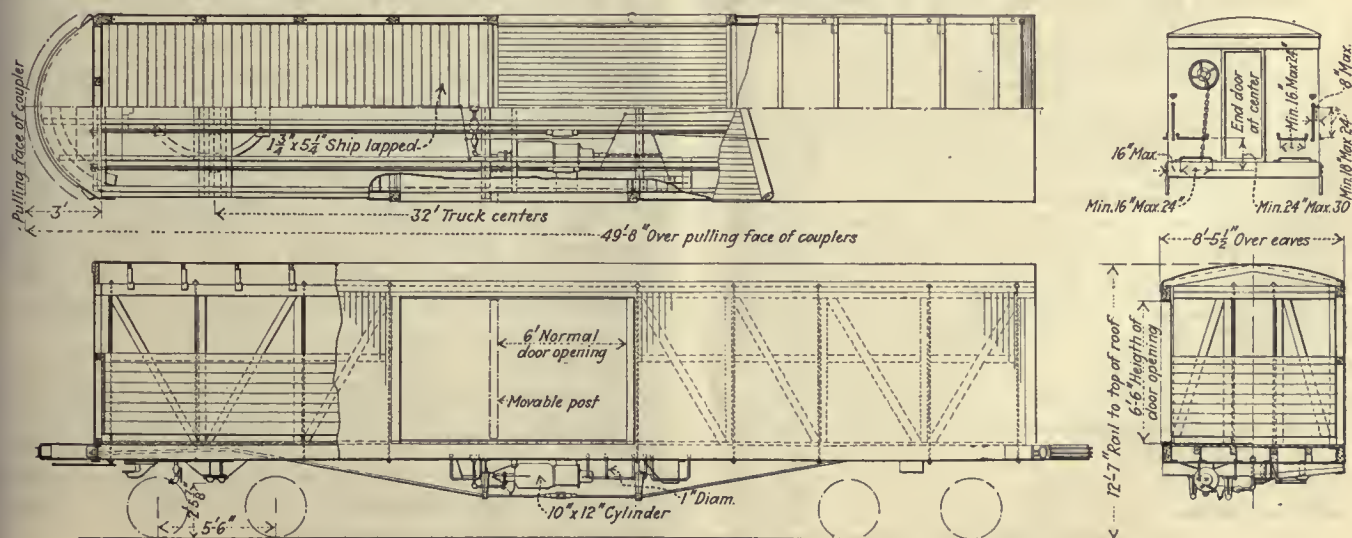
The companies which have already signed contracts, together with the number of cars ordered by each, are as follows:

Northern Ohio Traction & Light Company	25 cars
Michigan Railroad	15 cars
Western Ohio Railway	10 cars
Toledo, Bowling Green & Southern Traction Company	10 cars
Penn-Ohio System	10 cars

The Lake Shore Electric Railway was reported to be contemplating the purchase of twenty units, but this report has not been officially authenticated. The Terre Haute, Indianapolis & Eastern Traction Company and the Union Traction Company of Indiana are still undecided as to the number of cars which they shall purchase. The Detroit United Lines are in full accord with the whole general situation, but anticipate that several months must elapse before funds will be available for a purchase.

The cars are completely specified as to details throughout. A number of optional features, such as a choice between round and square ends, center or side location of end doors or their elimination, are left to the discretion of the purchasing companies. In such cases, however, the details of all possibilities are prescribed by the Master Mechanics' Association. Many details are specified according to A. E. R. A. standard or A. R. A. standard, but in a still greater number of instances the designers of the car have seen fit to break away from former practice and to establish entirely independent specifications for various features of the new equipment.

Some of the more essential features of the cars are detailed as follows:*



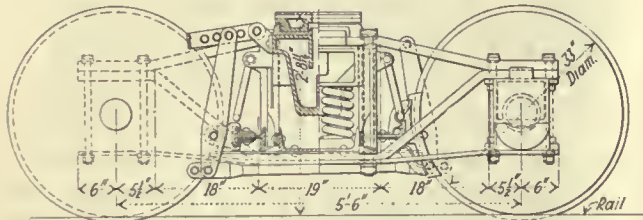
Plan and Elevation of Standard Freight Trailer. End Door Is Optional

Flooring—To be single thickness yellow pine 1½ in. x 5½ in. faced, ship-lapped and applied crosswise of car. At door openings there is to be applied an additional course of 1½-in. x 3½-in. faced maple floor laid longitudinally with bevel strips at edges.

Side and End Sheathing—To be of yellow pine 1½ in. x 3½ in. faced, tongue and groove “V” beaded, applied vertically. Flashing of galvanized steel to be applied at bottom of end sheathing. Joints are to be white-leaded.

Bolsters—To be built up of structural steel, box type, having 18-in. x ½-in. top cover plate, ⅝-in. web plate, 14-in. x ⅝-in. bottom cover plate and 3-in. x 3-in. x ⅝-in. bottom angles. The height of bolster over cover plates to be 10½ in.

End Sills—To consist of 8-in., 11½-lb. channels, fitted



C. E. R. A. Arch Bar Trucks for Freight Cars—Several Modifications Made in Design

between sill channels with flanges inward. To be connected to the channel sills by ⅝-in. bent plate connections and riveted to buffer beam top cover plate. End sill to have 6-in. x ⅝-in. bottom cover over full width of car.

Side Posts—To be of yellow pine 3½ in. x 4 in. Three side posts to be applied between door post and corner post at one end of car and two at opposite end of car. Vertical side frame rods to be ¾ in. in diameter, one located at each side post, corner post and door post, having single square nut and washer top and bottom.

Corner Posts—To be of yellow pine 3½ in. x 5 in. with curved yellow pine end corner post 4⅞ in. x 6½ in., with ½-in. steel curved corner post cover plate, secured by wood screws.

Inside Lining—Side lining to be 1½ in. x 5½ in. faced yellow pine, tongued and grooved and applied longitudinally. End lining to be 1½-in. x 5½-in. faced ship-lapped yellow pine applied horizontally over full width of car. Both to extend from 4 in. from top of floor to top of belt rail.

Carlines—To be 2½-in. x 2½-in. x ⅞-in. angles, bent at center and side plates and bolted to side plates with

one vertical bolt and one horizontal bolt through steel angle clip riveted to carline. Carlines to be spaced not more than 2 ft. 6 in. centers.

Roof—To be 1½-in. x 3½-in. faced tongue and grooved yellow pine, secured to carline fillers with one 2½-in. blind nail and one 1½-in. No. 12 flat head wood screw at each carline, set below the surface of the boards. Roof curvature to extend straight to end of car. Roof covering to be No. 8 duck laid in heavy white lead and oil applied on roof boards and canvas laid while paint is wet.

Side Doors—To be double doors for a 10-ft. opening, divided into a 6-ft. normal opening and a 4-ft. opening. The 6-ft. door will slide to the right. Doors are to be outside hung, with Camel Company's door hangers and fixtures, or equivalent, to be used. Opening between door and post in closed position to be made weather-proof.

Air-Brake Equipment—Westinghouse fundamental (HC) combined freight car brake equipment will be provided.

Brake Arrangement—Breaking power is to be 90 per cent of the light weight of the car, based on 50-lb. cylinder pressure. Levers and rods to be designed for emergency cylinder pressure of 75 lb. All brake pins to be 1½ in. in diameter, machined and case-hardened, and all brake pin holes in levers and rods to be bushed with hard steel tubing.

Couplers—It was considered advisable to specify the heavier type Tomlinson coupler, form 23, instead of the previous standard Tomlinson, form 13. Hence it was necessary to reduce the truck centers from 32 ft., as shown on the drawing, to 30 ft., in order to maintain proper clearances.

Wheels—Rolled steel wheels, 33 in. in diameter, A. E. R. A. standard, with 3½-in. tread.

Truck Bolsters—To be cast steel, suitable for 40-ton capacity truck, with side bearings integral and center plates cast separately and with vertical center dead lever guide brackets.

Truck Brake Rigging—Truck levers to be vertical with wrought-iron bottom connections. No part of truck brake rigging to be nearer than 6 in. to the rail.

More Insurance for Insull Employees

AFTER a year's trial of co-operative group insurance, the Chicago Rapid Transit Company, Chicago, Ill., and the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., have enabled their employees to double their protection by expanding the programs adopted in January, 1925.

The new plan adopted by the companies will increase the total coverage from about \$6,500,000 to more than \$12,000,000 life insurance, while the same figures hold true for the supplementary accidental death and dismemberment insurance in force. Under the combined plans, an employee receives \$2,000 life insurance and a similar amount of accidental death and dismemberment insurance.

The latter plan of insurance not only assures the payment of \$4,000 death benefits to an employee's beneficiary in the event of accidental death but also guarantees the employee himself certain fixed amounts for the loss of sight or limbs. The Metropolitan Life Insurance Company, which issued the original policies, is underwriting the additional insurance.

GENERAL DIMENSIONS OF THE C. E. R. A. FREIGHT CAR

Length over coupler pulling face.....	49 ft.	8	in.
Length over buffer beams	48 ft.	8	in.
Length inside at corner post	42 ft.	4½	in.
Center to center of king pin	32 ft.	0	in.
Width over side sills	8 ft.	3	in.
Width over side sheathing	8 ft.	4½	in.
Width inside	7 ft.	6½	in.
Width at eaves	8 ft.	5½	in.
Extreme width	9 ft.	0	in.
Rail to center of coupler	2 ft.	10½	in.
Rail to bottom of side sill	3 ft.	7 ⅞	in.
Bottom of side sill to top of side plate	7 ft.	11 ⅞	in.
Top of side plate to top of roof	0 ft.	12½	in.
Floor to under side of carline at center at door	7 ft.	9 ⅞	in.
Rail to top of roof at center	12 ft.	7	in.
Height of door opening	6 ft.	6	in.
Width of door opening	10 ft.	0	in.
Capacity	30,000 lbs.		
Trucks	Four-wheel		
Rail to center plate bearing surface	2 ft.	5½	in.
Track gage	4 ft.	8½	in.
Truck wheelbase	6 ft.	6	in.
Journals	5 in.	9	in.
Brakes	Inside hung		
Radius of sharpest curve at center of track	35 ft.	0	in.

Extensive Rapid Transit Plan Proposed for North Jersey

New Electric Railway System Comprising 82.6 Miles of Route Recommended in Report of Commission—Distributing Unit of System Would Be an Interstate Loop Line, 17.3 Miles Long, Costing \$194,000,000, Including Equipment—Double-Track Line to Battery to Be Built First

PRINCIPAL features of a comprehensive plan for passenger transportation between communities in the nine northern counties of New Jersey and the city of New York are outlined in a report submitted on Jan. 15 to the Legislature of the state by the North Jersey Transit Commission. A preliminary report presented about a year ago was abstracted in *ELECTRIC RAILWAY JOURNAL* for Feb. 7, 1925, page 222. The ultimate object of the program recommended is the creation of a new electric railway system comprising 82.6 miles of route, and the electrification of 399 route-miles of railroad now operated by steam. As the first step it is proposed to construct an interstate loop line 17.3 miles in length connecting with all of the north Jersey commuters' railroads and passing under the Hudson River into New York City by two tunnels, one uptown and one downtown. A new low-level subway through Manhattan would complete the loop. Construction costs of this preliminary project are estimated at \$154,000,000, with \$40,000,000 additional for equipment. The cost of power facilities is not included in this estimate.

In developing the plan three separate problems were considered. The first was to furnish rapid transit facilities for the area within 20 miles of New York City and to connect this area with Manhattan by facilities providing service comparable to that of present subways. The second problem was to provide eventually for a commuter or suburban transit service for the area within 40 miles of New York City. The third was to utilize the existing rapid transit facilities, the Hudson & Manhattan, the Interborough and the Brooklyn-Manhattan systems to serve North Jersey more effectively than at present.

As the result of the study of these problems the commission has recommended a program consisting of six principal parts. Listed in the order of their importance, they are as follows: (1) Construction of a new North Jersey rapid transit system. (2) Hudson & Manhattan Railroad extensions in New Jersey. (3) Interborough extensions of its Manhattan lines to New Jersey. (4) Brooklyn-Manhattan Transit system extensions from Manhattan to New Jersey. (5) Extension of north Jersey rapid transit system, listed as part one of this program, to serve a larger area. (6) Electrification of existing steam railroads.

Construction of this comprehensive system cannot be realized in any large way at the outset, the report states. Its tremendous cost alone precludes such a realization. It is outlined only as a guide to present and future transit development in this region.

The North Jersey rapid transit system, part one of the program, would consist of the following five lines: (1) Interstate loop line, running north and south be-

tween the Hackensack River and Bergen Hill in New Jersey, passing under the Hudson River via a tunnel at the Battery, up through Manhattan to 57th Street and back through another tunnel to New Durham. Its length would be 17.3 miles. A so-called Meadows transfer station would be located near the intersection of the Erie and D., L. & W. Railroads. (2) A line from Paterson through Montclair and Newark, following the interstate loop route through Manhattan to New Dur-



Operation Diagram of the North Jersey Rapid Transit System Showing the Five Routes Proposed by the Commission

ham and thence to Rutherford and Hackensack. The length of this route would be 41.9 miles. (3) A line from Ridgewood via Paterson, Passaic, Rutherford, New Durham, the interstate loop route in New York City, to Newark and Elizabeth. Route mileage would be 39.8. (4) An intrastate route from Elizabeth through Newark and Rutherford to Hackensack, 18.8 miles in length. (5) Another intrastate line from New Durham to Newark, 13.0 miles in length. The location of these routes is shown on an accompanying map.

Total mileage for the five routes would be 130.8, of which 48.2 miles would be duplication because some routes operate over the same tracks as others. The net total route mileage would be 82.6. Construction cost of the entire undertaking is estimated at \$260,000,000 with \$122,000,000 additional for equipment, or \$382,000,000 altogether.

Because the expense of building this system is thought to be too great to permit proceeding with it as a single project, the commission suggests that it be undertaken progressively. The interstate loop line constitutes the Manhattan circulating and distributing unit for the whole system and it is held to be logically the first construction step.

PRESENT SUBURBAN FACILITIES SATURATED

During 1924 the suburban railroads and ferries serving northern New Jersey transported to and from their terminals 246,000,000 passengers. Of these 201,000,000 were railroad passengers. A 24-hour traffic survey was made by the commission and the railroads working in co-operation. On the day of the survey 264,000 New Jersey commuters arrived in New York City, of whom 204,000 were railroad passengers. During the maximum half-hour period in the morning between 8 and 8:30 more than 25 per cent of the daily one-way traffic was carried, amounting to about 97,000 passengers. This is the real tax on the suburban transportation facilities. Some 71 railroad trains arrived at all the terminals combined during this period, or one train every 25 seconds on the average.

This state of affairs has almost saturated the existing suburban facilities serving northern New Jersey. The railroad and ferry traffic during the past ten years has increased about 46 per cent, or at an average rate of about 4 per cent per year. The need for relief is so urgent, the report states, that temporary measures must be resorted to at once. This is the basis upon which the plans of the commission have been developed and upon which its recommendations have been made, despite the fact that piecemeal rapid transit development is thought to be undesirable.

ALTERNATIVE MEANS OF RELIEF

It is recognized that there are two ways of serving the north Jersey commuter traffic. First, additional terminal facilities might be provided to relieve the present and increasing congestion. This would require all passengers to alight at the terminals just as they do now and to find their way by other facilities to their destinations. Second, the existing terminals might be abandoned and through service to New York City established, thereby delivering all passengers directly to their destinations without requiring them to transfer or use any other facility. The second is the alternative which the commission believes should be adopted.

To throw light on how the New Jersey lines should be routed, the traffic survey made by the commission included investigation of the actual destinations of the Manhattan-bound New Jersey traffic. Distribution of this traffic after reaching Manhattan is shown in the accompanying table.

Although the New Jersey traffic enters from the west, slightly more of it is bound east of Broadway than west of Broadway. The respective percentages are 52 and 48.

Analysis of the traffic distribution in Manhattan indicates, according to the report, that the first additional

transit facilities provided for New Jersey should enter at or near the Battery, and be routed up through Manhattan at least far enough to serve the 59th Street district.

Having determined that the north Jersey rapid transit line should cover Manhattan north and south, the next thing was to determine the streets along which it should be routed. A rapid transit line will conveniently serve a district a half mile on each side of the line, the report states. Manhattan Island at Chambers Street is about 1 mile wide, its width gradually decreasing to nothing at the Battery. Therefore a north and south line located anywhere below Chambers Street will conveniently serve that area. Above Chambers Street Manhattan increases to about 2 miles in width at Canal Street, and from there north to 125th Street its width remains constant. North of Chambers Street two lines located about half

DISTRIBUTION OF NEW JERSEY RAILROAD COMMUTER TRAFFIC IN NEW YORK CITY

Destination District	Per Cent of Total Traffic
Below Chambers Street	38
Chambers to Fourteenth Street	14
Fourteenth to 33d Street	15
33d to 42d Street	12
42d to 59th Street	10
North of 59th Street	5
Brooklyn	5
Queens	1
	100

a mile away on each side of the center will conveniently serve Manhattan from river to river.

Eventual construction of two lines up and down Manhattan are recommended. It is proposed, however, to construct only one such line at the start, and the East Side line has been selected for the reason that it enters Manhattan from the west and therefore will have to cross all the west side and central New York City rapid transit lines. In this way it will furnish its passengers with easy transfer facilities to such lines.

The proposed route is from the Battery under Washington and Barclay streets, Park Row, Mulberry Street, Lafayette Street, Irving Place, Lexington Avenue and 57th Street to the Hudson River. The loop will be a two-track line for its entire length excepting only a short distance in New Jersey where it will be four-track to permit Hudson & Manhattan trains to operate to the proposed Meadows transfer station. All under-river tunnels and all underground portions of the line will be constructed large enough to accommodate standard steam railroad equipment so that electric locomotives may haul commuter trains and standard steam trains around the loop pending the electrification of the suburban lines, after which it is assumed that multiple-unit equipment will be used.

Because it would be utilized in both directions the capacity of the proposed interstate loop line would be equivalent, it is said, to two two-track lines or one four-track line from New Jersey to New York City, although it consists only of a two-track line up and down through Manhattan. Its carrying capacity is estimated in the report to be as follows:

Tracks	2
Trains per hour	70
Cars per hour	770
Passengers per hour	77,000
Daily passengers	192,500

This estimate is based on the operation of 35 trains per track per hour. Each train would be of eleven cars and would carry 100 passengers per car. The daily

passengers is based on a rush-hour load ratio of 40 per cent of the daily one-way traffic being carried in the maximum hour.

METHODS OF FINANCING

There are three ways in which a transit project may be financed, the report states. Private capital may be called upon either to assist in the financing or to provide all of the money necessary. State, city or community credit may be utilized by issuing bonds. A benefit assessment plan may be used to raise the money under which each beneficiary, the rider, the taxpayer, the land owner and the steam railroad traversed may pay a share of the cost of the line and the service on it proportional to the benefit that each receives. These financial plans may be used separately or in combination with each other.

According to the commission a 10-cent fare will be possible on the interstate loop if the interest and sinking fund charges on the construction costs can be eliminated. However, if these interest and sinking fund charges must be included, or in other words, if all of the money must be borrowed and therefore the most costly method of financing must be adopted, then a 15-cent fare will be required. It is considered that the quantity of service provided would permit a comfortable rush-hour travel without excessive overloading. Seating capacity per car is assumed to be 72 and the average rush-hour load 100 passengers. This means on the average only 28 standees per car or a 40 per cent overload.

BATTERY LINE AS FIRST RELIEF

It is recognized that as a temporary expedient and as an emergency measure it may be necessary to start with a project requiring an even smaller expenditure than the \$154,000,000 required to construct the interstate loop line. In such an event the report states that the only recourse is to utilize some of the existing rapid transit facilities and to extend them somewhat. Construction of the proposed new Battery tunnel and the continuation of the line in New Jersey to and including the Meadows transfer station, constituting the southern part of the proposed interstate loop, will afford the easiest, cheapest and most effective means of securing immediate relief for northern New Jersey, the report states. Such a line might be operated either by the Interborough Rapid Transit Company, or the Hudson & Manhattan Railroad. If the Interborough becomes the operator the local tracks of the east and west side subways will be connected with the line at the Battery as a temporary measure, the west side subway by a short connection from Morris and Greenwich Streets, the East Side Subway by continuing the construction of the interstate loop line as far as Vesey Street, and further connecting it with the subway at Spruce Street. If the Hudson & Manhattan becomes the operator the Battery line will be continued as a part of the interstate loop to the first station in Manhattan at Morris Street, and there stop temporarily. The cost of the Battery line exclusive of power facilities would be \$73,500,000.

Besides possibly using the Battery line section of the interstate loop as a temporary transit measure, at some time in the future the Hudson & Manhattan System can be extended in New Jersey to advantage. Two such extensions are recommended. One is in Hoboken from the Lackawanna Station along Washington Street to Fourteenth Street, a distance of 1.3 route-miles, and the second is in Newark from the proposed Pennsylvania

Railroad Market Street Station out Clinton and Springfield Avenues to Springfield, a distance of 8.1 miles. This is a total of 9.4 route-miles and the cost is approximated at \$75,000,000, including equipment.

Similarly the Interborough Rapid Transit Company in time may have extensions constructed under the Hudson River to New Jersey. Three such possible extensions are outlined: First, the east side subway from Spruce Street via Vesey and Washington Streets to a tunnel at the Battery, a distance of 1 mile; second, the west side subway from Morris Street via Greenwich Street to the Battery and thence with the east side subway extension under the Hudson River along the Central of New Jersey right-of-way under the Boule-



Construction of an Interstate Loop Line Connecting All the North Jersey Commuters' Railroads with Manhattan Is Recommended by the Commission. Battery Section to Be Built First

vard, Tonnelle Avenue through Meadows transfer under Manhattan, Central, Bergenline and Anderson Avenues to Cliffside Park, a distance of 15.0 route-miles; third, the Queensboro subway from 41st Street and Eighth Avenue under 41st Street, the Hudson River and Franklin Street to connect with the Bergenline Avenue line, a distance of 2.5 route-miles. These extensions are all for two tracks and are roughly estimated to cost \$150,000,000 for construction and equipment. At the Battery these extensions would require their own tunnels so the operation could be entirely independent of the interstate loop.

The Brooklyn-Manhattan Transit Corporation Fourteenth Street line now terminating at Sixth Avenue in Manhattan could be extended under the Hudson River, Seventh Street, Hoboken, and South Street, Jersey City, to the Meadow transfer station, thus affording New Jersey commuters access to Manhattan at Fourteenth Street and thence across Manhattan into Brooklyn with

convenient transfer by means of the B.-M. T. lines to almost anywhere in Brooklyn.

Later on additional lines may be added to the north Jersey rapid transit system, thereby extending the advantage of rapid transit to a larger part of the inner ring area. Ultimately an electric suburban system for the commuters from the outer ring area may be inaugurated by electrifying the existing railroad facilities traversing the area, and thus furnishing a through service into and through Manhattan eventually for all commuters in New Jersey.

During the past year the work of the commission has dealt largely with the engineering features of the proposed plan. Co-operation was received from the Transit Commission and Board of Transportation of New York City, the Public Service Commission, the Westchester Transit Commission, the Port of New York Authority, the Regional Plan of New York and the various railroads.

In submitting its report to the Legislature the commission expresses the belief that the scope of its work is most clearly set forth by simply transmitting the report of Daniel L. Turner, its consulting engineer, and Charles N. Green, its chief engineer. An indorsement of the proposed plan by Col. William J. Wilgus is included at the end of the report.

Extent of Electric Railway Replacement by Buses

Survey Shows Transportation Service Now Being Rendered by Motor Vehicles on Approximately 2,000 Miles of Route Where Economic Factors Forced Suspension of Rail Operation

COINCIDENT with the development of the bus as an influential factor in city and intercity transportation, a considerable abandonment of electric railway trackage has occurred. A careful survey of the situation made by *Bus Transportation*, however, shows that economic factors, rather than bus competition, were the principal causes of these abandonments. The widespread use of the private automobile was a major factor. Rising costs of labor and materials without commensurate increases in revenue were additional factors. Although the bus was not the cause of the railway abandonments, its service has replaced car service on approximately 80 per cent of the route mileage.

Because the present bus routes do not in all cases follow exactly the same streets as the former car lines, it is impossible to determine accurately the mileage where service by bus has replaced service by car. In numerous instances a new bus route has been extended beyond the former rail heads to tap newly developed territory. On the other hand, in some localities where the railway track had already been extended into thinly populated and unprofitable territory the bus service has been established along only a part of the former route.

Replacements of rail service by bus service may be classified under three general heads:

(a) Abandonment in part of the trackage of an electric railway and the substitution of buses by the same or a subsidiary company.

(b) Abandonment of an entire electric railway system and the operation of buses by the same or a subsidiary company.

SUMMARY OF REPLACEMENT OF ELECTRIC RAILWAYS BY BUSES

	Number of Companies	Approximate Miles of Track
Substitution of buses for part of rail system	79	725
Substitution of buses for entire rail system with service now rendered by same company	30	395
Substitution of buses for entire rail system with service now rendered by separate company	67	880
Track abandoned and no service now rendered	54	500
Total	230	2,500

(c) Complete rail service abandonment and substitution of bus service rendered by some outside agency.

Among these classifications the first includes the largest number of companies. The survey shows that within the last ten years some 79 electric railways have suspended car service on certain lines totaling approximately 725 miles of track and now operate buses to serve the districts formerly served by the cars. It is interesting to note, however, that this represents only a comparatively small part of the total bus route mileage now operated by the electric railways. The remainder, over 12,000 miles of route, represents new service or service supplementing that rendered by the cars.

Reasons why rail routes or parts of rail routes have been abandoned and bus service commenced are numerous. Probably the most usual cause of a replacement of this kind is to save the expense of rebuilding track which has become worn out. Greater flexibility of bus operation as compared with car operation on single track lines is another reason. The possibility of slightly modifying the route by the substitution of buses for cars and thereby providing a more convenient service has been a factor in other specific cases.

Under the second classification are some 30 former electric railways which have abandoned all rail service on 395 miles of track and now operate buses exclusively. The mileage of the present bus routes totals slightly more than the former car routes, or a little over 400 miles. In general, the reasons why an entire railway system has been supplanted by buses are the same as those given in the preceding paragraph for the replacement of individual routes or parts of systems by buses.

Under the third classification the survey shows that during the past ten years 67 electric railways have abandoned all car operation on approximately 880 miles of track, and that traffic formerly dependent on the cars is now handled by buses operated by newly formed organizations. In some cases under this classification the operating personnel for the present buses has been largely drawn from the former electric railway personnel, although the company no longer has any corporate existence.

RECENT TREND TO RAILWAY BUS OPERATION

Comparison of the list of electric railways which have entirely replaced their car service with bus service with the list of those whose service has been replaced completely by bus service rendered by others sheds an interesting light on the development of the bus. The survey shows that there are somewhat more companies having been superseded by separate organizations than there are companies having themselves gone over to all-bus operation. It is noteworthy, however, that in the main the replacements by outside companies occurred during the early part of the decade just ended,

and that the tendency recently has been for the same company to continue to render the service, changing only the type of vehicle. In this situation is reflected the changing attitude of the electric railway industry toward the bus. Transportation men who a few years ago could see little merit in this type of vehicle have now come to regard it as a valuable facility.

In addition to the electric railway mileage on which car service has been replaced by bus service either by the same or a different agency, 54 small electric railways have completely suspended operation and no substitute transportation service of any kind is now provided. The total trackage involved, however, is less than 500 miles, or an average of about 9 miles of single track per company. These were, in the main, the so-called marginal companies which were built in sparsely settled territory and where the expected traffic failed to develop in sufficient volume to support their operation. The small average mileage per company well illustrates their unpromising character. Had their prospects been brighter they would undoubtedly have been merged with other companies to form larger and more stable systems. As it was, they were left to sink or swim, and were finally forced under by the economic pressure resulting from the war and the post-war readjustment.

Thus it will be seen that during the last ten years approximately 2,500 miles of electric railway track has been abandoned and that bus service is now supplied on about 2,000 miles, or 80 per cent of the total. Whether or not the substitute bus is providing service as acceptable as that formerly provided by the trolley is beyond the scope of this survey. To determine it would require comparison of frequency of service, rates of fare, riding comfort of equipment, adequacy of return on capital invested, etc. These factors it would be manifestly impossible to determine accurately for such a large number of situations spread all over the country.

Particular interest attaches to the cause of railway suspension. Contrary to a somewhat general impression, the bus had been responsible for the abandonment of comparatively little electric railway trackage. In many instances the survey showed that a considerable period of time elapsed between the suspension of rail service and the inception of bus service. Thus it appears that the bus was brought in to fill a transportation need created by the railway suspension and was not itself the cause of that suspension. In cases where the railways themselves undertook bus operation along routes formerly served by their cars, there was no gap between the ending of one service and the beginning of another. In the great majority of these cases, too, economic factors were the reason for replacement.

U. S. Pays Railways \$619,200

DURING the last fiscal year the Post Office Department paid \$619,201 to electric railways for the transportation of mail. The postal revenues accruing from the mails handled on electric railways aggregated \$499,591,478. During the current fiscal year it is estimated that mail carrying \$660,000,000 in postage will be transported by electric railways, for which service the government will pay \$715,913, or \$1,085 for each million dollars of the postal revenue.

During the next fiscal year the amount will have increased, it is estimated, to \$702,900,000 (revenue basis). The electric lines will receive \$725,000 for the service performed.

Fare Reduction Increases Revenue

By J. O. HORTON
West Penn Railways

BECAUSE of decreasing revenue it was necessary recently to take steps toward lowering expenses without lowering standard of service of one of the operating divisions of the West Penn Railways, joining the towns of Kittanning and Ford City. This line is 9.4 miles in length, serving an industrial and mining territory with a population of approximately 17,500. It is paralleled by a good hard-surface road, permitting unlimited competition from the private automobile, although there is no competing bus service. The only way available was to go to one-man operation. Service at that time was given by three two-man cars on a 30-minute headway, except that one terminal zone had only two trips in the morning and five in the afternoon.

Analysis of the rates prevailing indicated that one-man operation would be difficult with the diversity of fares. There were five zones, complicated by overlaps. There were six types of tickets, ranging from 5 cents (nine for 50 cents) for single zones to 14 cents (ten for \$1.40) for special three-zone combination. The cash fare was 6 cents and school tickets three cents per zone. Two-thirds of the revenue came from cash fares, involving much change-making. The ticket sale amounted to less than one-third of the revenue.

In view of the economy expected it was decided to revise the rates of fare and a liberal concession was made to regular riders. All previous adult fares were abolished in favor of a cash fare of 8 cents instead of 6 cents per zone, standard ticket fare of 6 1/4 (four for 25 cents) per zone and three weekly passes. The passes practically eliminate zone boundaries, inasmuch as one pass at \$1 covers above half the route, a second pass at \$1 covers the other half, while a third pass at \$1.50 covers the entire line, over which the original cash fare per trip was 30 cents and at present is 40 cents.

With simplification of fares, the classification register was replaced by a locked fare box. The following figures show that a loss of 4.61 per cent was changed to a gain of 9.52 per cent, an algebraic improvement of 14.13 per cent:

		Per Cent
First ten weeks, Sept. 20 to Nov. 29, of new fares, average weekly revenue compared with eight preceding weeks, increased		9.52
Similar comparison for corresponding period of 1924 shows a decrease of		4.61

Change in fares had an interesting effect on the ratio of revenue from different classes of riders, as follows:

	Old Fares	New Fares		
	July 27 to Sept. 20, Per Cent	Week Ended Sept. 27, Per Cent	Week Ended Nov. 29, Per Cent	Eight Weeks Average, Per Cent
Cash	69.1	19.6	8.6	11.3
Ticket	29.7	50.9	62.5	60.1
Passes .....	....	29.2	28.2	28.1

Saving in platform expense for seven weeks of one-man operation from Sept. 21 to Nov. 8 as compared with preceding ten weeks of two-man operation amounted to 42.5 per cent.

An additional car was placed in service on Nov. 9. This change gave extra service to the end of the line, a car each hour between 7 a.m. and 10 p.m., instead of tripper service morning and evening. The extra car decreased saving in platform expense, but for three weeks ended Nov. 29 a saving of 35.2 per cent was shown.

Association News & Discussions

Optimism Characterizes C. E. R. A. Midwinter Meeting

Many Speakers at Two-Day Session on a Variety of Topics Carry the Same Theme—Predictions for the Future Are Based on Accomplishments of Past Five Years

ENTHUSIASM to a greater extent than has been observed in any recent convention marked the two-day midwinter meeting of the Central Electric Railway Association held in Indianapolis on Jan. 28 and 29. More than 400 attended the sessions, and the estimates made by the dinner committee were exceeded by about 100 guests, a total of 264 being served at the Indianapolis Athletic Club.

President Frank R. Coates sounded the keynote in his presidential address. Progress made by the electric railway industry in the past five years, he said, is almost unbelievable. Recommendations of the Federal Electric Railways Commission have been carried out and the industry is now firmly on its feet and moving ahead. Mr. Coates' address and the other papers and formal discussions are published elsewhere in this issue.

The same theme was expanded and many illustrations were cited in a paper by Britton I. Budd, president Chicago Rapid Transit Company. In the absence of Mr. Budd it was read by C. E. Thompson. At its conclusion President Coates voiced the sentiment of the meeting in expressing sincere thanks to Mr. Budd.

R. H. Pinkley, assistant general manager the Milwaukee Electric Railway & Light Company, followed with a paper on the economic trends of electric railway and bus service, illustrating with the experiences of his own company.

Discussing Mr. Pinkley's paper, A. C. Blinn, vice-president and general manager Northern Ohio Traction & Light Company, said that electric railways must get into interurban bus operation. In general the managements have not been able to see the reasons for the falling off of the interurban railway business and the growth of the bus traffic. However, it will be necessary to use a new type of salesmanship to make the most of bus service. This matter of selling is of prime importance, in order to get automobile owners to leave their cars at home and ride the buses.

The use of special buses on tours presents a great chance for developing business, said Mr. Blinn. In fact, it may be one of the most profitable phases of the service. The equipment cannot be too good. In the past managements have been pennywise and pound foolish, he said. Cars appear to be preferred by passengers in the winter and buses in the summer, according

to the experience on the Northern Ohio property. The fares on both classes of service should be worked out in such a manner that each will have a chance to render service and return a profit.

Continuing the discussion, R. N. Graham, manager of railways Pennsylvania-Ohio Electric Company, Youngstown, Ohio, gave an outline of experiences and practices on his property. There is no rubber urge as such, he said. It is superior service that gets the results.

R. R. Smith, vice-president and general manager Chicago, South Bend & Northern Indiana Railway, made the point that the real menace to the electric railway is not the bus but the private automobile.

CAR MODERNIZATION URGED

Cars should be replaced as soon as new ones show a greater return financially than old ones, said Charles Gordon, assistant vice-president McGraw-Hill Company, in a paper on the economics of modern cars.

Concrete results of car modernization were given in a paper by L. J. DeLamarter, vice-president and general manager Grand Rapids Railway, which was read by Major H. C. Havens of the same company.

J. N. Shannahan, past-president of the A. E. R. A., in a few well-chosen remarks, stated that the industry is taking on a new life. He has observed that a more vital interest is being shown. This is due to a renaissance, he feels, which will have far-reaching results of great benefit to the electric railways.

The progress of the Central Electric Railway Master Mechanics' Association since its organization a year ago was outlined by its president, T. H. Nicholl, superintendent of motive power Union Traction Company of Indiana. In the central territory the railways started as independent lines with little in common. Their expansion has brought them closer together and has resulted in many problems connected with interchange of equipment. Freight service in particular has been handicapped. Organization of the Master Mechanics' Association was effected as a means of getting harmony between the various roads involved in this section. The group is small enough to handle any problem in a quick and effective manner. Its meetings consist of a general discussion and reports of committees, followed by a trip through the shops of

the local company where the meeting is held. One accomplishment has been to put in shape the interchange rules passed down from the old Engineering Council of the C. E. R. A. This took a great deal of time. Another piece of work which is ready for adoption, which will be a second forward step, is a uniform schedule of charges for work done on equipment of other roads in the association. Still another accomplishment is the design of a standard box car. A discussion of this design appears in another part of this paper.

FOREMAN CONFERENCE DEMONSTRATED

The work of a group conference, as practiced on the Boston Elevated Railway, was demonstrated by H. H. Norris, educational adviser of that company, with sixteen foremen, three of whom came from Boston, while the remainder were from the Indianapolis Street Railway and the Terre Haute, Indianapolis & Eastern Railway. This demonstration was given to show, for the benefit of the C. E. R. A. and the management and operation and education committees of the A. E. R. A., what can be accomplished by a group of foremen discussing problems which arise in their daily work. The demonstration, which was a condensation of a standard foremen's conference, showed a great deal of interest on the part of the men and the possibility of giving them a new appreciation of the duties and responsibilities of their positions.

Unusual in attendance and in the character of the talks, the dinner continued the theme of the meeting. The principal address, by Managing Director Lucius S. Storrs of the A. E. R. A., is published elsewhere in this issue. In a way which appealed to his listeners Mr. Storrs pointed out some of the dangers which can and have been overcome, and showed ways of analyzing the effectiveness of public relations work.

E. F. Wickwire had arranged to give the same address he had presented at the New York Electric Railway Association dinner the night before, but after making a desperate effort to be present, was unable to reach Indianapolis. His address was read by Labert St. Clair. An abstract will be found in this paper, issue of Jan. 30.

At Friday's session the same theme of optimism was carried forward by T. A. Kenney, vice-president Northern Ohio Traction & Light Company. Accomplishment rather than hopes marks the status of the electric railway industry today. When operators meet now they tell how things have been done, and how they have increased business both on rail and on bus lines. This testimony will be helpful, he said. The way to get more business, whether on rails or on co-ordinated systems, is to give service.

In order to get back the traffic lost by the rails to competitors a few years ago real service is needed. In the past these competitors have been able to offer a better service, although their operation was unfair in many respects. Undoubtedly the time is not far off when all forms of transportation will come to regulation on the same terms.

Mr. Kenney is a thorough believer in co-ordinated rail and bus systems and rail and motor truck systems. The advisability of considering door-to-door delivery should be considered. This service in competitive form took considerable business away from the interurbans. To provide similar service will get back a large share of the business that has been lost and will develop still more.

The central territory, largely because of its geographical location, has more than its share of competition. Not all the extensions of electric railways made twenty years ago were wise. The same holds true of some of the bus and truck lines now, he said. The men of the Middle West have had more vision than those in other parts of the country. Here is where the great automobile factories are located. There is more freight development in this territory than in any other. This business has been made profitable in many cases. Its growth has been remarkable. One company with a relatively small investment has developed a gross business of \$750,000 for 1925, with a good net revenue remaining.

He cannot advise too strongly in favor of going after the freight. Electric railways can deliver much more quickly than can the steam roads or the truck lines. However, there must first be an organization to solicit the business, and there must be adequate facilities, including terminals, to handle it.

The railway man is a much better business man than he was 25 years ago. He has become able to analyze costs. The executive has helped himself by these studies, and has shown the value of the rail lines. He also has been helped by the A.E.R.A. and its executives, particularly the Advisory Council and Managing Director Storrs. In conclusion, he said the electric railway has been shown to be an economic necessity. It is over the hill and is coming back in fine shape.

The place of the woman in the public utility business was considered in a paper by Miss Helen E. Steiner, director of public relations Ohio Public Service Company, Lorain, Ohio, who indicated many places which give opportunities where women can serve better than men.

OFFICERS ELECTED

C. L. Henry, receiver Indianapolis & Cincinnati Traction Company, stated that the constitution of the C. E. R.A. fixes the executive committee at twelve members. The limitations are such that only one new railway member can be added each year. The association voted to appoint a committee to consider a change in the constitution. The report of the nominating committee, which was accepted and the nominees declared elected, was as follows:

President, G. K. Jeffries, general

superintendent Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis.

First vice-president, M. Ackerman, general manager Lake Shore Electric Railway, Sandusky, Ohio.

Second vice-president, W. S. Rodger, general traffic manager Detroit United Railway, Detroit, Mich.

Secretary-treasurer, L. E. Earlywine, Indianapolis.

Executive committee: F. R. Coates, Toledo, Ohio; Harry Reid, Indianapolis,

Ind.; J. P. Barnes, Louisville, Ky.; R. I. Todd, Indianapolis, Ind.; A. C. Blinn, Akron, Ohio; H. A. Nicholl, Anderson, Ind.; F. W. Coen, Sandusky, Ohio; J. F. Collins, Jackson, Mich.; G. R. Millican, Evansville, Ind.; John Benham, Chicago, Ill.; J. H. Drew, Mansfield, Ohio; J. P. Longon, Cincinnati, Ohio.

Following the election Mr. Jeffries was conducted to the platform and installed as president, after which the meeting adjourned.

The Industry Has Kept the Faith*

Recommendations of the Federal Electric Railways Commission Five Years Ago Have Been Followed and Wonderful Progress Has Been Made—The Public Has in the Main Done Its Part Also

BY FRANK R. COATES

President Central Electric Railway Association

DEPENDABILITY of promises usually can best be judged by the performance of past pledges. It is fair, then, in considering the electric railway industry's present pledge of good service to review its record of carrying out its promise, made to the federal government and car riders five years ago, to improve local transportation throughout the country. That promise has been kept, and, having kept it, the industry is entitled to the confidence of riders when it says it

will go on providing the best possible local transportation, both by car and bus, in the future.

All of you doubtless will remember what caused the federal government to become interested in the future of electric railways. During the war they were called upon to function as a part of the government war machinery and they readily responded. An office was maintained in Washington throughout the war and every available facility of the industry was placed at the disposal of the government. Thus President Wilson learned first hand that the properties, owing to rapidly increasing wages and material costs, were in a bad way. At one time one-sixth of the mileage of the country was in receiver-ship and it looked as if the rest of it might go in at any time. Many of the largest companies in the country were involved.

Realizing how necessary electric railways were to the welfare of the country, President Wilson appointed the Federal Electric Railways Commission to investigate the situation and make recommendations to help the industry get back on its feet. This commission consisted of representatives of the public, labor, financial institutions and electric railways. Hearings were held in New York and Washington for about a year and every phase of the electric railway business was gone into. Summarized, the commission found that the industry was without financial credit and was not performing its public function of furnishing good local transportation.

The primary causes of this condition were found to be economic. Contributing chief influences named were increased labor and material costs, early financial mismanagement of properties and failure of the uniform 5-cent fare.

To cure this situation these remedies were suggested:

Restoration of credit by removing public antagonism, enlisting public co-operation and assuring the investor a fair return on his investment.

Economy in operation, improved service and assurance of a fair return on a fair property value.

Elimination of special assessments for sprinkling, paving, construction and maintenance costs of bridges used as highways.

*Presidential address before the Central Electric Railway Association, midwinter meeting, Indianapolis, Ind., Jan. 28-29, 1926.

COMING MEETINGS

OF

Electric Railway and Allied Associations

Feb. 8-11—American Institute of Electrical Engineers, midwinter convention, 29 West 39th Street, New York, N. Y.

Feb. 11—Central Electric Railway Master Mechanics' Association, Portage Hotel, Akron, Ohio, 9 a.m.

Feb. 18—A. S. C. E., A. S. M. E., A. I. E. E. and A. I. M. E. E., joint meeting, Engineering Societies Building, New York, N. Y., 8.15 p.m.

Feb. 24-26—Electric Railway Association of Equipment Men, Southern Properties, Mobile, Ala.

March 8-11—National Railway Appliance Association, annual exhibition, Coliseum and Annex, Chicago, Ill.

March 9-11—Oklahoma Utilities Association, annual convention, Mayo Hotel, Tulsa, Okla.

March 12—Pennsylvania Street Railway Association, annual meeting, William Penn Hotel, Pittsburgh, Pa.

March 17-18—Illinois Electric Railways Association, Illinois State Electric Association and Illinois Gas Association, annual joint convention, Springfield, Ill.

March 23-25—National Conference on Street and Highway Safety, Washington, D. C.

April 13-16—Southwestern Public Service Association, Galveston, Tex.

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

Strict regulation as public carriers of jitneys, motor buses and similar public motor conveyances.

Public control flexible enough to assure sufficient revenue to pay the entire cost of service, including both capital and labor costs.

Fair valuation of property and voluntary reduction of excessive capitalization to the basis of the property value.

Installation of the cost-of-service plan, experiments having proved that it results in a fair return upon capital, establishes credit and effects reasonably satisfactory public service.

Payment for extensions into new territory by property thus benefited.

Living wages, humane hours of labor and working conditions for employees; settlement of labor disputes voluntarily or by arbitration in a binding manner which will eliminate both strikes and lockouts.

The only thing that the transportation leaders asked was that the public do its part in bringing about the rehabilitation of service as suggested by the commission.

That was five years ago. Today, when you make a survey of the industry and see the progress it has made along lines laid down by the commission, the situation seems unbelievable. Without question electric railways have kept faith with the government, and the public, in the main, also has done its part.

To summarize briefly, today virtually every large property in the industry either is out of receivership or on the verge of emerging from it. Included in properties in receivership are those of Kansas City, St. Louis and Denver, all of which may come out at any time. Then there will be very few large properties in the United States under the direction of the courts.

More than 16,000,000 persons are being carried annually by the properties. This is particularly significant when it is taken into consideration that there are probably 17,000,000 pleasure automobiles in this country, in addition to a very large number of buses.

CARS AND BUSES GO TOGETHER

One of the outstanding problems of recent years, the co-ordination of car and bus service, is being solved rapidly. Today more than 5,000 buses are being operated by some 275 electric railway companies in co-ordination with their car service, and the tendency to run both buses and cars under single managements is decidedly on the increase.

Those are the high points as revealed by a quick survey. Let us now consider specifically how the industry has carried out the suggested remedies of the commission.

The initial recommendation of the commission that public antagonism be removed and credit thus restored has received the chief attention of managements. The commission's investigation showed plainly that the best way to get riders behind managements was to clean house, have a good story to tell and then tell it as often as possible. The industry as a whole has done just this thing. Financial reorganization has taken place on a wide scale, and with houses clean, managements have invited the public in to see that not only do things appear well on the surface, but that no dirt was swept under the beds. More than 300 companies, embracing a very large majority of the mileage of the country, today are doing intensive public relations work through paid advertising, publicity, public

speaking and personal contact with customers.

Credit has not been fully restored, but it is decidedly on the mend. Whereas five years ago it was practically impossible to go into financial circles and effect a loan, this is not the situation today. More and more financial people are coming to realize, through learning true conditions in local transportation from managements themselves, that there is a very decided demand for electric railway service where progressive, honest, enthusiastic management is in charge of a property, and the public is fair; the securities of that property usually offer a safe investment. The credit of properties will continue to improve largely in proportion to the management's efforts to remove public antagonism by honest endeavors to give good service. And since the majority of managements are making this effort, the outlook for steadily improved credit conditions is good.

Great forward strides have been made in effecting economies in operation. The necessity for making every dollar count has spurred operators on to the exercise of great care of expenditures. The result has been that properties today are being operated more efficiently and economically than they ever have been in the past. With this economical operation has come improved service. Managements everywhere realize that the best service results from running cars only where there is a demand for them that will pay a reasonable return. As a result many branch lines, which probably never should have been built, have been eliminated from service in recent years. In some cases buses have supplanted these lines, and in this service the bus has proved very helpful. Doubtless it is in such supplemental work that the bus eventually will find its most important field.

A good start has been made by the public in eliminating special assessments, particularly for paving, and much more should be done along this line. Complete or partial relief from paving burdens has been afforded companies in two states and about 50 cities. It must be said frankly that one reason why this relief has not been more general is that electric railway managements themselves have not properly presented their story to the public. It is a rare community indeed which, when it is told the whole story of electric railway tax burdens, will not indorse some sort of relief. If the industry will carry on this campaign for tax relief properly, good results doubtless will be obtained. It cannot, however, expect the public to rise up voluntarily and begin to lop off taxes.

Regulation of jitneys, motor buses and similar public conveyances, recommended by the commission, has been widespread, but much more must be done, particularly in a national way, with this situation. Since the commission made its report various legislative bodies in some 38 states and the District of Columbia have regulated these vehicles as common carriers and required them to obtain certificates of convenience and necessity before operating. National legislation of a similar character now is pending in Congress.

The Supreme Court recently held that no official body had any control over motor vehicles engaged in interstate commerce, and, as a result, the National Association of Railroad and Utilities Commissioners has had a bill introduced which seeks to put motor vehicles in the same regulated class as our steam and electric lines.

The readjustment of fares, so as to insure sufficient revenue to pay the entire cost of service, including both capital and labor costs, has received widespread and respectful attention by the public. The 5-cent fare, and, in fact, all fixed fares, have been practically wiped out. Today, with the exception of about a dozen communities, the principle of riders paying a fare of sufficient amount to meet all costs of operating a road is generally recognized. A later survey of the association shows that 83 cities have a 10-cent cash fare, three a 9-cent, 31 an 8, 67 a 7, 47 a 6, and only ten the original 5-cent fare.

FARES GOVERNED BY LENGTH OF RIDE

The sum and substance of the whole fare situation is that if rides are short enough and costs are low enough they probably can be provided for 5 cents, or even less, but if rides are not short enough or costs low enough more than a nickel will be required. Fares respond to the same inexorable economic laws as any commodity.

In these days of public service commission valuation the cry of watered stock is a hollow one. Stories of such historic financial jugglery came up frequently in the commission hearings, and doubtless there was truth in the claims that there was some mismanagement in the early days. But nowadays fares are fixed on the value of the property, and hence so-called watered stock has nothing to do with them. Furthermore, commissions and managements themselves have pretty thoroughly drained all the water out of electric railway securities.

Service-at-cost plans have worked out well in some communities. The theory of service at cost, which is simply providing a fair ride for a fair return, is becoming universal.

The recommendation that property owners pay for extension lines into new territory has not been generally adopted, and this is due in part to the rapid development of the bus. Nowadays most companies are serving sparsely settled new territory with buses until such time as laying of rails is warranted. There have been some cases where communities have paid for laying rails.

Electric railway labor today is receiving the highest wage in the history of the industry, except for a short time in 1921. The most recent report shows that 85 companies, operating more than 100 miles of track each, are paying an average of 56½ cents an hour to their men. This is more than double the average wage that was being paid at the beginning of the European war. The average annual earnings per man in the industry is about \$1,700. When regularity of employment is taken into consideration, the electric railway men's jobs are good ones indeed.

The foregoing, in brief, is a summary of how the electric railway industry has kept its faith with the government and the public. Of still greater importance, the industry has kept this faith gladly. Its greatest desire is to continue successfully along the lines it has been following in the last five years, but to go forward to still greater achievement. It recognizes that carrying, as it does, four out of every five

persons who ride any kind of a vehicle, it has a great duty to perform to the public. At the same time it recognizes that, representing an investment of almost \$6,000,000,000, it has a similar duty to perform to some 1,300,000 investors. Its purpose, in a nutshell, is to render the best service possible at the lowest cost consistent with obtaining a fair return on the investment for its efforts.

Winning Public Good Will*

Many Methods Have Been Used in Grand Rapids to Obtain Public Recognition for the Railway and Overcome Long-Standing Indifferences and Prejudice

By L. J. DELAMARTER

Vice-President and General Manager Grand Rapids Railway

GOOD will and good public relations are the fulcrum by which the street railway industry will elevate itself into greater community confidence and service, municipal co-operation and increased revenues, provided that at the same time the industry offers the improved degree of service the public now expects and demands through its usage of vehicles offered by automotive manufacturers.

The success of winning good will depends so much upon the intangible, indefinite "feeling" to do the right thing at the right time, to take full advantage of changing conditions promptly, to believe enthusiastically in your job. Admitting that during the past few years to believe enthusiastically in the average street car with the same color scheme, the same flat wheels, same old slat or cane seats, same clangy gongs, same old more or less dirty blue uniforms, same old dirty windows, same old advertising signs and same old hundred and one things that our fathers and some grandfathers looked at, one has to have some vision and be considered about ready for the asylum.

The history of the street rails in Grand Rapids during the past few years, we presume, is more or less similar to that in most cities. Using the history of the Grand Rapids property for the past few years as an example will, it is believed, bring out the points to be emphasized. Confronted with the necessity of a new franchise, of refinancing and asking for increased fares during the interim and other problems known to most general managers, all of these problems now being behind us, we believe is proof that our good-will methods, in a general way, have brought definite results, as the company now has a 30-year franchise, an 8 per cent allowed return, a 10-cent cash fare with six tokens for 50 cents. When our new service-at-cost 30-year franchise was submitted to the people, with no appeals for public favor, such as lower fares or extensions, it was approved by 72 per cent of the electors voting. Before the election the franchise was approved by all the local newspapers, by ten improvement associations, by nineteen civic bodies, by the four noon-day luncheon clubs, be-

sides various other clubs and organizations, including the Trades and Labor Council.

In addition to the franchise we have refinanced our entire bonded indebtedness without recourse to capital reconstruction. The bankers gave much credit to and were influenced to a great extent in approving the refinancing because of the good will as evidenced by the attitude of the city authorities, the local newspapers and the public. In our judgment public good will was one of the biggest single factors entering into the refinancing. We also secured, previous to the passing of our franchise, several increases in fare without any decided opposition.

In winning good will the three main factors, we believe, are: (1) Relations with newspapers; (2) relations with city authorities; (3) relations with the public, car riders.

In relations with newspapers the prudent manager will always keep his mind open and alert to cultivate the friendship and confidence not only of the owner or editor but of reporters and the desk men. Meet the newspaper reporter as a friend, make the effort to see him in his office if possible, and always in your office if he calls, for it is he who writes the articles that help mold good will for your company. If he is not your friend, the artful newspaper reporter can subtly inject into his articles a sting that hurts, or, being friendly, he will unconsciously reflect in his articles an intangible good fellowship that helps create popular favor for the railway company. Encourage friendship of or acquaintance with the desk men, the copy readers and others on the newspaper staff who, in some way, may some time handle the news pertaining to your company. They play a vital part in your good will program because they edit or headline the news matter, and into the "heads" they write they can also reflect the good will they unconsciously feel for your company if they are on friendly terms with you.

The local manager who feels above accepting advice from a newspaper man, who is in touch with the public and its affairs, is losing a trick. My experience over years with dealing with newspaper boys is that whenever one has something he doesn't want printed, by coming "clean" and explain-

ing why it shouldn't be printed, 99 per cent of the boys will not betray confidence. On the other hand, if they get a news "tip" and you try to evade it, they will dig up the facts and print them and you have forever lost good will and confidence, for which you will have to pay eventually. The same rule applies to city authorities.

How well our policy serves in creating and sustaining public good will is reflected, quite forcefully, in the fact that not one adverse editorial or so-called "Letters from the People" article has appeared in the local newspapers during the past three years. The company's program has been constructively supported.

We have been fortunate in receiving unsolicited editorial support that has a far-reaching effect in helping the public have a better understanding of the street railway's problems. An example of this editorial co-operation, taken from the *Grand Rapids Press*, issue of Aug. 10, 1925, reads:

Since the days of the horse cars there has never been a defensible reason for requiring the street car company to pave between the tracks, except the obvious one that the company has to do it to get the franchise and the city wants the money. The street cars do not touch the pavement and the wear upon concrete or brick between the tracks is from precisely the same vehicles as run over other streets. The ingenious claim that street car line paving, due to vibration of the tracks, will not last as long as paving elsewhere, seems to have been developed to bolster an obsolete and unjust tax against the street car company.

Illustrations of the thought given to crystallizing sentiment in favor of a public utility:

In the Grand Rapids theaters no criticism or ridicule of the street railway's cars, service or its interests is used by actors. This is because of the selling to local theater managers the idea that they should help the local railway and have the actor cut out anything adverse to its interests. Civic contact to further good will is gained by the officers of the company, like those in other cities, belonging to the leading clubs and organizations.

Talks are broadcast regularly from the local station by our safety engineer, known to the radio fans as "Uncle Bob." He gives a general safety talk and quietly injects interesting suggestions regarding the railway company. This broadcasting has secured splendid good-will results.

Our advertising, always optimistic, appears in many forms, newspaper ads, car posters, folders, pamphlets, theater slides, motion pictures, construction signs, and others. *Trolley Topics*, a monthly publication for car riders, has 36,000 circulation and is being increased to 50,000. An interesting good-will phase of this work was the conducting of a referendum on the three new trial coaches by ballots in *Trolley Topics*.

Novelty advertising, such as our "Don't Worry" campaign, not only caused much favorable comment but impressed the message that the "street car is the safest place in the city." It proved beneficial.

We occasionally employ a refined woman to criticize, from her viewpoint, what is displeasing to the car riders. Her reports have been far reaching in results because they have

*Abstract of a paper presented before the Central Electric Railway Association, Indianapolis, Ind., Jan. 28-29, 1926.

taught us good housekeeping methods for our cars. We believe that managers should make a real, studied effort to anticipate criticism of service.

Don't forget to keep on your Christmas list the man who has done favors for you but can't any more. Aim to do thoughtful things when you have no ax to grind. Don't forget to write a longhand note promptly to your friend, with an expression of appreciation. Don't dictate it. Cultivate the crossing policemen. Don't merely send them cigars at Christmas time, but occasionally write a personal note, or an appreciative word to their chief.

The city authorities, with their political futures at stake and the old "fight the corporation" in their blood, offers serious consideration. The first step toward the goal is to sell the idea that the street railway business is a legitimate one and not illegitimate. Then by systematically visiting city officials at their offices for frank discussion of your problems, asking for advice, giving thoughtful consideration to their side of all questions, the majority of public officials, properly approached, will meet you part way at least.

Again, it is our belief that city authorities may be "sold" any proposition better by local manager, attorney or engineer than by outsiders.

During our recent car test in Grand Rapids we have proved beyond any doubt that cheery, comfortable cars, courteous and neatly uniformed operators, giving rapid service commensurate with safety, not only have created and established a greater good will through public relations but have tended to shatter the false belief held by many people that the gasoline-propelled vehicle is spelling the doom of the electric street car.

Because attractiveness and comfort are two of the surest methods of regaining lost patronage, keeping old customers and winning the potential car rider, our three new electric rail coaches, aided by the remodeled Birney car, the "Ramona," and other newly painted cars, also prove that new and cheerful color combinations, newly devised comforts and the latest refinements are winning the people back to the street cars. This has been exemplified both by increased riding patronage and greater public interest and good will on the lines where the cars have been operated. Echoing back to the company come words of unsolicited praise or satisfaction from members of societies and clubs expressing their delight for the new cars and their many refinements and comforts. Many letters are also received complimenting the company for its progressive efforts. In fact, street cars are more talked about favorably in Grand Rapids than ever before.

The new electric rail coaches in Grand Rapids have exceeded our expectations. They are responsible for a great amount of the good will as shown; they are indelibly impressed on the minds of the people. I dare say that if any one in this audience has relatives in Grand Rapids and should write them regarding the new coaches a very general description of the

"St. Louis," the "Minnesota" or "Ohio" would soon be received. They have created interest.

OTHER MEANS OF GETTING GOOD WILL

Developing industrial riding, offering through trip cars to industrial districts, adopting motor bus equipment for two purposes, feeders to existing railway lines and independent routes in new territory, operators' visits in uniform to the homes of patrons of their lines to sell the company's service; utilization of the corner drug store, a long-neglected asset, for the display of time-tables in neat standards on showcases and otherwise aiding in selling the service, are other features of the good-will policy of the company.

An outstanding feature by this company in promoting good will, as evidenced by results and by widespread interest, is the establishment of a Commercial Drivers' Club. Organized by our company's safety engineer, the club is made up of the drivers and operators of trucks and other commercial vehicles. Its membership is more than 2,200. It dominates the commercial traffic situation. Bi-weekly meetings are held in the railway company's assembly hall, in which the company's operators join. The delays, the accidents, the displeasure of patrons occasioned by the lack of co-operation between electric cars and vehicles on the street is a serious problem well known; the creation of this organization has to a great extent furnished the remedy. It has established a desirable contact between drivers and car operators and is eliminating the old blocking of tracks and frequent belligerency. It has been instrumental in helping popularize street car riding by speeding up running time and reducing collisions.

Not only to the city as a whole does the management endeavor to carry the gospel of greater service and public utility good will, but to the sectional business or community district located in various outlying districts. By paying small but important attention to these growing and enterprising localities and appealing to their pride and loyalty the railway management, it believes, is gradually building up a confidence and patronage that is limited only by the future growth of the city itself. For instance, the company named a newly painted and very attractive car the "Creston," after one thriving business section. That community quickly responded as these lines from the *Creston News* show:

The Grand Rapids Railway got the jump on Santa Claus and last Saturday surprised the residents of Creston by putting into service on the Division-Plainfield line a very attractive street car that has been christened "Creston."

Harmonious color combinations, glistening varnish surface, gold letters and installation of comfort-giving devices all combine to make the latest innovation of the street railway company's system and service in Creston in keeping with this rapidly growing and progressive part of the city. Creston residents are proud of this car and desire, through the *Creston News*, to thank the railway company for this fine favor. . .

An anticipated reaction came almost immediately from Burton Heights, another prosperous district at the opposite side of the city and at the other end of the same street car line that

serves Creston. The editor of the *Burton Heights Record*, with true and loyal spirit for his equally thriving section, penned an editorial, under the caption, "Why Not a Street Car Christened Burton Heights? Of course Burton Heights merchants and residents received their car.

Then Madison Square, another busy district, acquired the new car name habit and through its community newspaper appealed for a car named after the Square. The request was granted. And just a few days ago another outcropping of regional pride for and interest in brightly painted street cars was chronicled. The residents of Fairmount Park asked the railway company to do them the honor of naming a car after that community. This good-will opportunity was quickly grasped by the railway management.

In furthering this community interest, we have inaugurated another name plan that probably will be far reaching in good will and financial profit because it extends to hundreds of homes where ancestral pride, fond memories and the cherished records of public accomplishments are recognized by the railway company and friendly reaction is and has been created.

Names of worthy early settlers, pioneers and prominent citizens whose public records and business achievements have written their names indelibly into the history of Grand Rapids are being used. Until recently this would have been impossible because no family would have found pride and satisfaction in having its name or that of its ancestor emblazoned on one of the old, rattling dreary cars. They would have procured an injunction to prevent it. Now people asking for it and submitting names. The management is receiving much whole-hearted co-operation in the new names-for-cars scheme as a substitute for the old numbering system.

Today the pleasing color combinations on the three trial coaches have caused so much favorable public reaction that tests have proved the people will wait for and ride in these new cars in preference to the older types. Cultivating good will in another direction is the illuminated dash and pennant design. By using the pennant colors of local schools, both public and parochial, universities and colleges, attention of the students and alumni is attracted, then pride for their alma mater makes them friendly to the car company for displaying their favorite colors. Carrying the plan still farther, the Grand Rapids management abolished the cold-blooded number system for its operators, substituting neat and attractive name plates that are displayed in the cars; this in addition to the neat chauffeur uniform adopted early last year.

Summed up, the Grand Rapids Railway is:

Endeavoring to capitalize on harmonious color combinations to eliminate red from its ledgers and change its bank accounts from silver to gold.

Educating its employees that a request, prefaced with "please" and spoken with a smile, proves the best

broadcasting code to tune in on the public.

Abolishing the word "can't" from its service lexicon.

Proving that good public relations is the father of good will, and that service is the mother of efficiency.

Teaching its operators that a shave today is worth two tomorrow.

That a motorman is best known to his patrons by the back of his clean collar.

That "safety first" is the greatest agent the adjustment department has as a dividend saver.

That every happy, satisfied patron can be made a good singer—of the praises of the street railway company. Solos are best heard and appreciated.

A rider's smile for an employee's kindness sometimes stretches to the promotion department.

Visualizing the industry and its conditions, I firmly believe that the pendulum of public opinion has started to swing back from the privately owned auto to the electrically operated rail coach. Our industry was doomed to pass through this evolution period. Nothing that we might have offered in the way of a vehicle, even a gold plated one, could have saved us from this cataclysm. It had to be. Now many of the American public, for various reasons, seem to have had their fling with motor luxury and are ready

to return to the street car. The psychological moment is here. The trend proves that. But we must be prepared to aid that return, to hasten that moment, by offering the public a more attractive electrically operated rail coach that represents the utmost in comfort, than we have for years past. This adds to the continued studied effort for good will.

The days of miracles in public service have passed. Our books, records, methods and procedure must be open to all. Being a legitimate business we should have nothing to hide, nothing to obscure. Many companies are passing through financial crises. To survive, to be of the fullest service, they must be rehabilitated both morally and physically.

By morally I mean that there must come between street car users and street car companies a closer and more helpful relation.

By physically I mean that street car properties must be thoroughly modernized. We have passed through a severe period of destruction. That which has been torn down must be rebuilt. To rebuild requires money, courage and patience. We are facing forward. Aided by the combination of cordial public relations and modernized equipment the industry in which we are all so vitally interested will progress and prosper.

definitely determined. There has been and will continue to be a marked reduction in non-essential interurban operation.

As the automobile becomes more generally used streets and their intercity highways rapidly developed. The jitney competition reached a climax in 1914-15, utterly failing in its purpose, though encouraged by early legislation, or lack of legislation, and propaganda. The jitney gave way to some extent to the city bus; then the intercity bus became a menace to the interurbans. Although unable to replace the latter, the electric rail service nevertheless suffered great harm.

In order to co-ordinate the various branches of its service, the Milwaukee Electric Railway & Light Company found it expedient to extend its bus service in other directions where business warranted, over the excellent paved highways radiating out of Milwaukee, without regard to the location of its existing interurban railways. It now operates 56 buses in interurban service, serving a territory having a radius of about 100 miles, with Milwaukee as its center, and covering 805 miles of interurban routes. The company also operates 36 buses in strictly city service and 32 buses in conjunction with street car lines.

The total gross receipts of the Milwaukee Electric Railway & Light Company for all bus operation in 1925 was well over \$1,000,000, showing a substantial increase over receipts for the year 1924.

At the time of this writing the company is encountering no bus competition. The regular responsible high-class railway and bus service, as rendered by the company, has discouraged numerous competitors. In the early days of bus development many promoters appeared in the field, whose sole purpose was to inaugurate competing bus lines with the idea of selling these out at a profit to the then established operating concerns. This sort of promotion no longer forms a profitable occupation. There have been times when bus manufacturers have been tempted to back and finance the promoters of this kind of bus competition for the purpose of forcing the sale of their particular make of equipment. I am glad to say, however, that this practice is no longer considered ethical. Competition at its best in public utility service is expensive and the public must ultimately pay its cost. The best safeguard for both the public and the operators is to have all transportation utilities regulated by state authority.

The interurban railway furnishes its own right-of-way, nevertheless it is tremendously taxed due to its monopolistic character. The same legislatures that have taxed the interurban railways as monopolies have constructed highways with public funds and permitted the unrestricted operation of competitive bus and truck service over such roadways. This condition is being rapidly changed by the ever-increasing taxes which are being applied to bus operation and by increasing demand for proper state regulatory measures. In the instance of one company, it might be stated that the taxes and municipal

Economic Trend of Interurban and Bus Services*

While It Is Hardly Possible that Much Interurban Construction Will Take Place in the Next Few Years, the Interurbans Will Use the Bus to Amplify Service

BY R. H. PINKLEY

Assistant General Manager
Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

WHEN work is plentiful and wages are reasonably high the American public is not generally guided by considerations of efficiency and economy in choosing its means of transportation, especially when one of these means possesses the element of novelty. More adverse times tend to force conclusions along more logical economic lines. Therefore it is difficult to analyze economic trends of services which have not yet fully yielded to the pressure of economic laws.

The present era of prosperity, which has provided a private automobile for almost every American family, has greatly stimulated the desire for travel; it has also increased the demand for transportation facilities to such an extent that most electric railways have been able to hold their business in the face of growing competition. Each locality has its peculiarities, and to determine adequately the general trends of public travel would require collecting and summarizing a large mass of data, the results of which would not apply to the average situation. This discussion will, therefore, be confined to developments in the State of Wis-

consin which have come under the writer's observation, and particularly the experience of the Milwaukee Electric Railway & Light Company.

An example of foresight was exhibited in the case of the Chicago, North Shore & Milwaukee Railroad, which was originally built on a straight right-of-way with flat grades, except in one location where village streets were used and where a new cut-off has recently been completed. The Milwaukee Electric Railway & Light Company is now engaged in projecting extensive cut-offs on two of its interurban lines, which, in addition to furnishing rapid transit to local districts, will serve to shorten interurban routes and to remove the traffic from public highways. These are instances of trends of development which should give the interurbans advantages over possible competitors.

The development of bus operation has effectually checked expansion of interurban railways for the past few years, and it is quite certain that, except in rare and special instances, no new interurban railways or extensions to existing lines will be built for a number of years to come, or until the distribution of traffic between these railways and competing buses has been

*Abstract of a paper presented before the Central Electric Railway Association, Indianapolis, Ind., Jan. 28, 1926.

fees for operating a 29-passenger intercity bus in Wisconsin now amount to nearly \$800 a year. It is certain that as the bus industry expands it must be placed under the same state supervision and regulation as other carriers. The ultimate result must be that the buses will serve territories not now adequately served by interurban railways.

Even at this time it is found that the public sometimes shows a preference for the electric railway instead of bus service. This was demonstrated in the case of the village of Whitefish Bay, a suburb of Milwaukee, in the fall of 1925, where the company offered to substitute buses on a parallel concrete road, giving more frequent service with the bus than with the existing cars. The trial operation was made for a period of 30 days and then an additional trial of 30 days operation giving parallel electric car and bus service. A referendum was taken at the polls, resulting in a two to one majority in favor of restoring the car service. The principal influences which prompted this decision were the fear that the buses, being unregulated, might be discontinued at any time if found unprofitable and that the buses might not be found as dependable in case of heavy snow.

To undertake to give reliable and continuous transportation service to a community is no light obligation. The interurban railways have demonstrated their ability to do this and have shown their willingness to spend large sums of money when required to clear the lines of snow and in other ways to maintain continuity of service.

Development of the bus business has been so rapid in the past five years that any equipment more than one year old at this time might be considered out of date. Neither bus operators nor equipment manufacturers can well predict what will be the last word in bus development. The manufacturers are in a continual state of despair because nothing can be standardized and every job must have special features. The de luxe bus of today may be passé next spring. However, we venture to prophesy some of the features that may be expected following the present trend of intercity bus development:

1. Weights of buses for interurban service will not be materially increased. Highway officials will see to that.
2. Interior frills and fancies must yield to more plain and substantial features which can be maintained with reasonable expense. Comfort and ease, however, cannot be sacrificed. Headroom may be increased and the general height made greater, especially where there is heavy short distance riding.
3. More steel and metal and less wood will be used in frames and bodies.
4. Balloon tires are being tried and if found practical may be adopted.
5. Four-wheel brakes of pneumatic or hydraulic types will be considered essential.
6. More powerful engines will be developed, possibly by adopting eight cylinders, but certainly not less than six. Bus patrons are just as particular about vibration and excessive gear noises as the private car driver.
7. In general, riding qualities of buses will more nearly approach private car standards.

An important feature in the trend of bus operation is the development of proper standard sizes of buses to be used for various conditions of traffic. This requirement must be determined for each locality and for each condition of traffic. There is no doubt but

what the lighter weight vehicles traveling on more frequent headways will draw additional traffic. Any decrease in seating capacity, however, increases the operating cost per seat. A bus which carries only eight or ten passengers must average 50 per cent of its seats filled over every mile of its operation to pay its way, whereas a bus which seats 29 passengers may be operated with an average of 30 per cent of its seats filled at all times. It is obvious, therefore, that if smaller vehicles are used either the traffic must be fairly dense or a higher rate of fare must be charged.

The financing of bus operations presents special problems. Although the investment required is not large

compared with that for railways, working capital is needed, the financial risk is high due to the uncertainties of the business and the borrowing power is relatively low due to rapid depreciation of the equipment. Properly enforced state laws requiring certificates of convenience and necessity or equivalent broadly protective franchise grants are essential to the financial welfare of any public transportation utility. The trend of bus line ownership is toward the larger, well-established companies which have developed valuable properties, and especially toward those which have earned the full confidence of the public and in which the public has acquired a direct financial interest by purchase of preferred stock.

Determination of Satisfactory Bus Fares*

By R. R. SMITH

Vice-President and General Manager
Chicago, South Bend & Northern Indiana Railway

DEVELOPMENTS in the interurban and bus business in the State of Wisconsin are dealt with in Mr. Pinkley's paper. On the whole, his conclusions and findings as to the trend of interurban and bus service apply equally well in the State of Indiana. This being true, it may be interesting, and it may throw some additional light on the subject, to outline some of the experiences through which the company I represent has passed in endeavoring to meet the situation created by the bus.

In my opinion the real menace to the electric railway industry is not the bus. It is the privately owned automobile. That is the threatening cloud on our horizon.

The Chicago, South Bend & Northern Indiana Railway was the first electric railway in the State of Indiana to operate buses. Like the Milwaukee company we early decided to protect our position as the natural and proper agency to furnish whatever transportation was reasonably demanded by the public in the territory served by our lines. However, we did not reach this decision in regard to our interurban service until we had felt the effect of bus competition by independent operators. We had previously established city bus lines in territory not served by street railway lines.

As soon as our interurban lines began to feel the effects of unregulated bus competition we established intercity bus lines paralleling the interurbans. Where possible to do so at a reasonable price, we purchased the bus line of our competitor. Where our competitor had an exaggerated opinion as to the value of his line, we put on our own buses. In some localities this resulted in the field formerly served only by the interurban being served by two bus lines in addition. One serious effect of this overdose of transportation was to educate the public to demand more service than could possibly be given at a profit. With a rate of fare on the bus lines sufficiently below the interurban rate to attract travel, it is not difficult to make a guess as to what happened to interurban earnings.

In June, 1925, we decided it was time for us to begin a series of experiments with interurban equipment and also with our rate of fare. We had two objects in mind: First, to ascertain the effect on the volume of traffic of a new type of interurban car at a lower rate of fare than our basic 3 cents per mile, and, second, to convince our bus competitor that we could so reduce his income as to force him to do business at a loss.

We placed in service two interurban parlor cars equipped with individual chairs, carpeted floors and a new lighting system. In these cars the wooden bulkhead between the motorman's compartment and the smoking compartment was replaced with glass. We changed the position of the heater so as not to obstruct the view of the passenger who wished to look ahead down the track. It is certainly not particularly pleasant for a passenger to gaze at a wooden partition, and we argued that if he could look ahead along the road in a bus, why not in an interurban.

On one interurban division we established an excursion rate of 1½ cents per mile, with a 25 per cent reduction for commutation riders. On another division we established an excursion rate of 2 cents per mile, with the same reduction for commuters, and on our third division we maintained our old basic rate of 3 cents per mile. All rates were made good for single one-way trip on every train, and on account of the fact that commutation tickets were sold by the drivers of buses we placed commutation books in the hands of our conductors so that passengers need not be put to the inconvenience of going to any of our stations to purchase them. Every interurban conductor was practically made an agent of the company for the sale of tickets. The rate of fare on buses was made the same as on the interurbans. We were therefore in a position to study the effect on travel of three different rates of fare and also in a position to study the effect of having interurbans and buses operating at the same rate of fare.

From the day it was established the 1½-cent per mile rate showed for a period of three months an increase of 92 per cent in the number of passen-

*Abstract of discussion before the Central Electric Railway Association, Indianapolis, Ind., Jan. 29, 1926.

gers carried by interurban lines. The 2-cent rate showed an increase of approximately 70 per cent, while the number carried on the 3-cent rate showed a consistent decrease. Buses, at the 1½-cent rate, showed practically the same increase in number of passengers as the interurban. From the increased number of passengers carried, it was evident during this period that many owners of private automobiles put up their cars and made use of either the bus or the interurban.

Within three months our principal bus competitor negotiated with us, with the result that we were able to purchase his certificate at a reasonable figure. Since gaining control of the bus lines, we have continued our experiments with our interurban rates, using 2 cents per mile on interurban cars and 2½ cents per mile on our buses, with 25 per cent reduction in commutation rates. With these rates of fare in effect, we showed in the months of November and December, 1925, an increase in the number of interurban revenue passengers of more than 60,000 compared with the same months of 1924. The number of passengers carried on our intercity buses, however, has shown a steady decrease since the establishment of the 2½-cent per mile rate. It seems evident to us that the rate of fare charged is a very considerable factor in determining the distribution of traffic as between interurbans and buses.

We now control all intercity bus operation in our territory except one stretch of 14 miles. Service has been co-ordinated so that where we formerly operated hourly interurbans we now operate in addition an hourly bus schedule, so staggered as to give a half hourly service on one type of vehicle or the other.

Our parlor cars have been operating at the same rates charged on other cars and have proved very popular, so much so that it is now a problem to care for the number of passengers who wish to use them. The decreased seating capacity of the parlor car makes it possible to handle only about 50 per cent of the number of passengers which can be carried on the old type of car. The exclusive use of parlor cars would therefore mean a very considerable increase in interurban equipment.

In that an intercity bus usually picks the passenger up at his door or drops him there, we feel that that service is a preferential one. The passenger should therefore pay more for this class of service than for the interurban, where he may have to walk a half mile to the nearest stop.

From our experience we have drawn certain conclusions, which may be summed up as follows:

We are convinced that the character of service and rate of fare are large factors in the success of interurban service. Interurban cars must be comfortable, clean and fast. While these three qualities are essential, please place the accent on comfort.

When bus competition was first started, if we had met it by improving our interurban service and adopting a lower rate of fare, it would have been possible to prevent a large part of this competition.

The bus is admirable for opening new city lines and in interurban territory not served by other means of transportation. In territory adequately served by existing lines the independent bus will eventually be eliminated.

The bus fits in very well in handling summer excursion business. The automobile has educated the traveling public to the point where it does not always want to return to the same old amusement resort. The bus meets this need.

In bus service the selection of the proper size of vehicle for the service to be performed is an important factor. It may mean the difference between a profitable and unprofitable

operation. Today the cost of taxes and passenger insurance on a 25-passenger bus in intercity service in Indiana approximates \$875. If a 21-passenger vehicle would perform this service there would be a very considerable saving in this one item.

Properly co-ordinated bus and interurban service has its place in thickly populated territory, the bus taking care of local business and the interurban handling through limited business.

Finally, it is our conclusion that while the interurban and the bus each has its proper field, the bus is not nearly the menacing and serious problem it was a year ago.

Experience with Interurban Railway and Bus Service*

By R. N. GRAHAM

Manager of Railways Pennsylvania-Ohio Electric Company, Youngstown, Ohio

SINCE Mr. Pinkley has covered the full amplitude of his subject, I will content myself with discussing those phases wherein the operations of the company by which I am employed differ from those more particularly noted by Mr. Pinkley.

The interurban services of the Pennsylvania-Ohio Electric Company were originally developed as extensions to urban street railways, so the tracks in general follow the public highway and were primarily intended to serve growing suburban residential districts. Our rights-of-way in general are subject to the burdens of street and highway improvements.

No part of the United States is free from problems presented by the ever-increasing use of the private automobile, and these problems are acute in the case of our own property. Under these circumstances the natural line of reasoning seemed to call for two policies:

1. To endeavor, by any reasonable means in our power, to preserve our traffic in the face of the competition of the privately owned automobile and necessity of advancing fares.

2. To reduce expense of operation in conformity with changed conditions.

Both these policies pointed to the necessity for acquiring a new type of equipment. From the standpoint of preserving our traffic, it was necessary that our interurban cars should be comfortable in seating and in riding qualities, attractive in appearance, well lighted and well ventilated.

Fortunately, with the developments in the art, it was possible to secure cars not only attractive in appearance and riding qualities, but at the same time furnished with such modern electrical equipment and of such light weight as to reduce materially expense of maintenance and cost of power. These cars were designed for one-man operation, which made a further saving.

Within the past three years all of our interurban and suburban lines have been equipped with cars of this modern design. We operate no cars in pas-

senger service on any of our interurban or suburban lines which require the services of two men. As a result of the light weight of these cars it has been possible, with the same expenditure in maintenance of track, to keep our roadbed in much smoother and better condition, and even with very much reduced cost of maintaining equipment it has been entirely feasible to keep our rolling stock in such condition as to paint, upkeep and cleanliness as to render these vehicles attractive, with the general result that we are holding our own in traffic notwithstanding the very general increase over the country in the use of the privately owned automobile. Through the economy brought about by the use of this type of equipment we have more than held our own in the general operating result of our interurban and suburban operations.

With an experience of from one to three years on all our suburban lines with this type of equipment we feel that we can readily subscribe to the following conclusions:

1. That the operation of interurban and suburban cars in industrial districts of comparatively heavy traffic, with the use of one man on the car, is entirely efficient and satisfactory.

2. That the substitution of lightweight, attractive, modern equipment for heavier interurban equipment of the older type under such conditions is entirely justified from an economic standpoint.

3. That the expenditure to provide new equipment with comfortable upholstered seats, attractive lighting fixtures, plate glass window and good floor covering produces an adequate return in greater inducements to the riding public.

In the keen competition with the advantages offered the industrial rider by the use of his private automobile it is necessary to give concentrated attention to the subject of schedules to best serve individual manufacturing plants which may be located on the various lines. Special fare should also be studied which might be an inducement to special groups of riders, such as those working at industrial plants.

*Abstract of discussion before the Central Electric Railway Association, Indianapolis, Ind., Jan. 23, 1926.

Further attention must be focused on the development of courtesy and salesmanlike attitude on the part of the operators of the cars. To overlook means or methods of advertising our product is to lose a valuable opportunity to improve the gross.

We were early compelled to parallel our suburban lines with bus lines in order to meet bus competition. While we still maintain such lines, they are in no case directly parallel except in point of route. The bus fares are higher than the corresponding railway fares and the bus service is being maintained as a supplementary or express service for those willing to pay the higher fare for a different sort of transportation.

On the other hand, it has been our policy, both in city and in interurban operation, to extend bus service into localities where no street railway service exists at the present time. In our operation we use 57 city buses and 27 interurban coaches. During the year 1925 our gross income from bus operation was approximately \$1,000,000.

From our experience we find that when a superior service is given by the

bus the people have no objection, apparently, to paying more money to take the bus, but when the quality of service is substantially the same we have found little difference between the attitude of the public on those routes that are served by street car lines and those served by bus lines.

In city operation the chief handicap of the bus is its limited carrying capacity, and we feel that the single-deck city bus cannot be operated profitably at the city rate of fare except where the lines are short, in our own experience the critical length of bus route being 3 miles.

In the operation of buses, the same as in the operation of street cars, there is a benefit to be derived from standardization, in economy of buying and storing parts. If a vehicle is originally well designed for the service in which it is to be run it is hardly necessary to change it with every passing whim or fancy of the body or equipment manufacturer. In this connection I think that we may still be guided by the essayist who said:

Be not the first by whom the new is tried.
Be not the last to lay the old aside.

The Utility Powder Puff Versus the Utility Razor*

BY HELEN E. STEINER

Director Public Relations Ohio Public Service Company

WHAT the world needs at present is not more power but a more wise distribution of power; not more energy, but a wiser conservation of energy; not more capacity, but more personality. It is horse power that we as a nation have developed for the last hundred years, and not human man and woman power. Every man here should take heed and develop his man and woman power. That is the most important work you can do in your relations to the public—build up your man and woman power, make it better, make it more adaptable.

A mechanic can fix your automobile if it goes awry, but when something goes wrong in your organization, in your contacts with the public, you cannot go to a garage for the remedy. You must then have experts in humanics and not mechanics. As "a man is judged by the company he keeps" so a public utility must be judged by the employees it keeps.

Public utilities are daily becoming more sensitive to that fact. They are, at least most of them, educating their employees in the knowledge of the company and its business and in the matter of public relations. Employees should all be schooled in the art of handling the public, for public regulation of utilities calls for 100 per cent co-operation from every man and woman on the payroll. No company can afford to keep an employee who does not live up to an appreciation of this fact. It is worse than money wasted, it is an investment jeopardized, for any employee not to work in the

closest possible harmony with the executive heads who are putting their whole souls into the building up of good public relations.

The place of woman in the business world is just as legitimate as that of man, and it offers equal opportunities and possibilities. Woman is looked upon in a great many cases as only a pencil pusher or a key puncher with the ability to do one thing perfectly—namely, to "powder her nose." We can't hold that against women, for we all have our little vices and idiosyncrasies, and while woman is queer a man is still more queer! For to him it's the razor that is nearer and dearer. That thought has given me my subject this morning. The "Utility Powder Puff vs. the Utility Razor" is but a polite way of putting the age-worn question, Why not have women in the industry filling the same places that men occupy and receiving equal recognition?

Although Christopher Columbus is given credit for the discovery of America, it was a woman who had the faith to look beyond the superficial beliefs of the ages and to see possibilities which brilliant men had rejected as impossibilities. Had it not been for Queen Isabella of Spain, Columbus might never have had the ships with which to cross the ocean.

Behind every great event in life—past, present and future—may be found the hand of woman if we but search for it. Women today are gradually taking their places in the business world and exerting their influence directly, where before they exercised it indirectly.

Are you men in the railway industry

capitalizing on the genius and ability of your women employees, and on women in general? Are women playing as great a part in your industry as they should? Are they contributing to the upbuilding of better public relations?

In seeking a satisfactory solution of the public relations problems you men have learned to attach a deeper significance to the word "Service." The thought of serving, of helping and of doing more than just that which is paid for, is becoming more and more a dominant note. In order to make your service of greater convenience to your customers you must consider more than their mere legal rights and imperative necessities. Service has an intangible value that cannot be measured in dollars and cents or by yard sticks or tape lines. It spreads and grows from day to day. We might say it is cumulative and compounds daily. Good service becomes an amazing asset, poor service becomes a liability. You can sell transportation to mankind, but its greatness depends upon the degree of service rendered.

Service is not entirely dependent upon the quality of your commodity, but real service means the smile and pleasant greeting accorded patrons; it means quick and efficient handling of complaints; satisfactory adjustments; in short, it means what money cannot buy—the intangible something that makes a man feel that he wants to have more dealings with your company. Such a condition can come about only through the channels of properly trained employees and more prominence accorded to woman. For I believe that a woman in most cases is more efficient than a man in meeting another woman. Women in every department of your industry can appeal more forcibly to other women, who form the major portion of your passengers.

A.S.M.E Asks Help for French Exchange Professorship

IN ORDER to effect the full exchange of French and American professorships, the American Society of Mechanical Engineers, through the activities of its secretary, Calvin W. Rice, is attempting to secure contributions from those who may be interested in aiding this cause.

For some years there have been a number of scholarships under which students may study in foreign lands, but too little provision has been made for an exchange of professorships. The simple exchange of one outstanding educator from European schools makes it possible to establish a valuable contact for thousands of students. For a number of years seven American universities, Columbia, Harvard, Johns Hopkins, Cornell, University of Pennsylvania, Massachusetts Institute of Technology and Yale, have been exchanging professors with the universities in France. Eminent men have thus had the opportunity of broadening their views and many students have profited in this exchange.

Those who are interested should communicate with Calvin W. Rice, who will be glad to receive contributions.

*Abstract of a paper presented before the Central Electric Railway Association, Indianapolis, Ind., Jan. 29, 1926.

American Association News

American Executive Committee

Many Important Matters Discussed and Progress Reports Received at Indianapolis Meeting

SINCE there was no midyear meeting of the American Electric Railway Association this year, the regular meeting of the executive committee was held at Indianapolis on Jan. 29 in connection with the midwinter meeting of the Central Electric Railway Association. There were two sessions, the first taking up regular business. A luncheon meeting followed, at which the committee chairmen presented oral reports of progress.

At the morning session the members present were President F. R. Coates, Managing Director Lucius S. Storrs, Executive Secretary J. W. Welsh, Harry Reid, C. L. Henry, H. L. Brown representing E. F. Wickwire, J. H. Hanna, J. H. Handlon, C. R. Ellicott, E. P. Waller, T. A. Kenney, M. B. Lambert, A. W. Brady, G. H. Clifford, J. N. Shanahan, C. R. Harte, J. J. Stanley, S. J. Cotsworth, B. A. Hegeman, Jr., and Thomas Finigan.

The budget submitted by the Engineering Association for the expenditure of funds appropriated at the last meeting of the executive committee was approved and referred to the finance committee for action.

The publicity committee reported that a series of speeches has been prepared by Labert St. Clair under its supervision. These have been worked out in co-operation with the state and sectional committees on public utility information. It was reported that the manufacturers' campaign is well under way. Posters, stickers and signs have been prepared, as announced previously in this paper. The demand for these up to date has been considerably greater than was anticipated.

For the membership committee, Mr. Hanna made a detailed report. The result of the campaign for new members has been very encouraging. There has been a growth of 128 manufacturers in the past three years, or more than 50 per cent, while the railway members have remained at the same number, even though there have been not a few consolidations in this period.

Telegrams of regret that they could not be present at the meeting of the executive committee from W. H. Sawyer and G. H. Harries were read by the chairman.

Harry Reid, for the committee on national relations, stated that the bill for the regulation of interstate bus lines sponsored by the National Association of Public Utilities Commissioners has been introduced both in the Senate and in the House. He hopes that hearings will be held during the month of February. Attention was also called to other pending legislation, including the railroad labor bill and the Cummins transportation act.

On motion of Mr. Reid, made at the suggestion of H. L. Stuart, it was decided to reprint the speech of Managing Director Storrs made at the C.E.R.A. banquet Jan. 28.

Mr. Reid announced the death of W. H. Maltbie of Baltimore, a chairman of committee on special taxes and of the committee on valuation. It was the expression of the executive committee that this loss leaves a place that it will be difficult to fill.

J. J. Stanley, J. H. Hanna and A. W. Brady were appointed a committee to prepare suitable resolutions on the death of Mr. Maltbie.

The publication committee presented a brief report through Mr. Welsh. The progress of *Aera* was noted. Attention was called to the preparation of pamphlets on education in collaboration with the committee on that subject.

Chairman C. E. Morgan of the committee on location had planned on attending the meeting, but because of a train delay was unable to be present until the luncheon meeting. This made it impossible to hold a meeting of his committee prior to the executive committee meeting. Mr. Stanley and Colonel Alexander of Cleveland invited the association to that city for the convention. Mr. Ellicott pointed out that the association should go where it will get the most for the money expended. Cleveland is near the center of the country and also near the center of the automotive industry. Its facilities are excellent.

Mr. Hanna called attention to the meeting of the conference on street and highway safety which will take place next March. He felt that it is a subject of great importance to members of the association.

President Harte of the Engineering Association presented a plan for the elimination of a great deal of the routine business of that association at the annual meetings. The principal feature of this is elimination of the procedure of acting on standards submitted by the various committees on the floor of the convention, and substituting a letter ballot. This would give time for the consideration of live topics and the presentation of papers and discussion. After some discussion, in which it was brought out that the floor vote is not representative, and sometimes leads to disregard of the standards adopted, it was approved.

The special committee on awards, of which Mr. Storrs is chairman, reported that propositions had been received for contests among electric railways from *Electric Traction* and *Forbes* magazine. The report was referred to the committee on policy.

Resolutions were adopted on the

death of past-president John I. Beggs. The death of Past-President Joel Hurt was announced.

COMMITTEE CHAIRMEN REPORT AT LUNCHEON MEETING

Following the morning session, the members of the executive committee and committee chairmen were guests of President Robert I. Todd of the Indianapolis Street Railway at a luncheon given at the Indianapolis Athletic Club. The principal business at this meeting was to hear reports of progress from the various committees of the association. This is a new feature, which was begun by President Coates at the November meeting of the executive committee.

J. H. Handlon, for the Claims Association, reported that excellent progress is being made by that association. For the advisory committee on electric railway finance, H. L. Stuart stated that the total public financing of purely electric railways last year, in amounts of more than \$250,000, amounted to approximately \$30,000,000. The electric railway securities, he said, were wholesaled very quickly, some of the issues going in less than two days. Mr. Stuart strongly recommended campaigns for local stock ownership. Mr. Lambert said that in his talks with electric railway men a question that has been asked is where they can get money for improvements.

In the absence of Mr. Wickwire, Labert St. Clair gave a brief report of the committee on co-operation with manufacturers. He described the signs and posters that had been prepared. Advance requests had far exceeded early estimates, he said, so that he will have to revise his figures for printing the posters.

Mr. Clifford stated that the work of the committee on co-operation with state and sectional associations was progressing in fine shape in all but two districts. Steps are being taken to arouse interest in these districts, and it is hoped that definite results will be had in the near future.

For the education committee, H. H. Norris, speaking for Edward Dana, said that the plans announced at the last executive committee meeting are under way. The committee on management and operation has been co-operating closely with the education committee. At the suggestion of Chairman Carbutt of the former committee, a demonstration of a foreman conference was put on before the Central Electric Railway Association the day previous, for the benefit of both that body and the education and management and operation committees. Mr. Lambert brought out that this conference had been held at considerable expense, the Boston Elevated Railway, the Indianapolis Street Railway and the T. H. I. & E. Electric Railway having furnished men to make the demonstration possible. On his motion, a vote of thanks was given these companies for their co-operation.

G. C. Hecker, secretary of the management and operation committee, represented R. F. Carbutt, who had been called away. He outlined the meeting which had been held Wednesday night at Indianapolis. This committee, he

said, is planning to have an extensive campaign of visits to various properties.

The manufacturers' engineering committee held two meetings, said Chairman G. C. Hecker. The first problem was to design a series of cars and the second to make operating studies showing where new cars have reduced maintenance expense and have increased riding. The committee is also studying methods of refinancing to make the purchase of new cars possible.

Charles Rufus Harte, the new president of the Engineering Association, outlined the change in organization of the Engineering Association by which the way committee and the building and structures committee have been combined. Mr. Harte also asked that the association use the Engineering Standards. He stated that a great deal of work is done by the engineers and the standards are not always used.

President Coates reported that a letter of invitation for the 1926 Charles A. Coffin prize contest has been sent out.

For the Transportation and Traffic Association, Mr. Clifford stated that it is working on four principal subjects. There is a great deal of enthusiasm in this association and he is looking forward to an excellent convention.

C. E. Morgan, chairman of the committee on locations, was detained in New York and did not arrive until near the end of the luncheon. He stated that sub-committees had visited Cleveland and Atlantic City, and that propositions had been received from other locations. No meeting of the whole committee had been held, so that no recommendation was made. Mr. Morgan told of the possibilities of these various locations. In order to facilitate preparations for the next convention, a sub-committee of the executive committee was appointed to consider the report of the committee on locations with power to act. This sub-committee consists of C. E. Morgan, chairman; T. A. Kenney, J. H. Hanna, Harry Reid, E. P. Waller, Thomas Finigan and C. R. Ellicott.

The executive committee decided to hold the convention on Oct. 4-8 inclusive.

Following a vote of thanks to Mr. Todd for his many courtesies in connection with the meetings of American Association committees held in Indianapolis, the section adjourned. The next meeting of the executive committee will be March 26 at New York.

Management and Operation

ON JAN. 27, following a dinner arranged for through the courtesy of L. M. Brown, a meeting of the committee on management and operation was held at the Indianapolis Athletic Club, Indianapolis, Ind. Members present at the meeting were: R. F. Carbutt, chairman; Morris Buck, C. L. Van Auken, E. J. Dickson, H. H. Norris, S. E. Emmons, D. J. Locke, A. C. Spurr, J. E. Wayne, G. B. Powell representing Samuel Riddle, F. L. Butler, L. M. Brown, J. F. Johnson, R. R. Smith, J. S. Hyatt, R. H. Pinkley, W. H. Burke, C. J. Griffith, W. W. Holden, A. Blunk representing S. B. Irelan, R. J. Lockwood, G. I. Plummer, R. R. Hadsell and G. C. Hecker. Frank R. Coates,

J. W. Colton, Labert St. Clair, G. H. Clifford, T. O. Kennedy, A. E. Scott, James Harmon, J. Q. Martin, John Mellett, J. H. Handlon, J. B. Stewart, Jr., and C. F. Young were present as guests.

Chairman Carbutt stated that this meeting had been called primarily to discuss the procedure outlined for the committee this year. He then introduced John Mellett, executive secretary Indiana Public Utilities Association, who delivered a brief address of welcome.

F. R. Coates, president of the American Electric Railway Association, expressed his appreciation to the members for their participation and particularly for their attendance at this meeting. He spoke of the excellent work done in past years and said he was sure the committee would continue its activities this year with even greater enthusiasm.

Chairman Carbutt read a telegram from Managing Director Lucius S. Storrs, who expressed regret at his inability to be present, stating that he felt there were great possibilities for bringing about improvements through the collection and dissemination of information by personal visits of committee members. He also said that they can be of great service in ascertaining personal opinions of railway executives regarding the major problems on which the association should concentrate for the best interest of the industry. The chairman then informed the committee of the death of two of its members, Ralph D. Hood, Haverhill, Mass., and F. I. Fuller, Portland, Ore.

The procedure outlined by the advisory board, consisting of the chairman and regional directors, was read by Mr. Carbutt. He then called on the regional directors to discuss the proposed procedure and to comment on the work done during the past two years.

Mr. Boyce expressed his thanks to the members in his district for their attendance at the meeting and his appreciation for their co-operation last year. He said that it would help members making visits if both Mr. Storrs and Mr. Coates would write to the managements of the properties to be visited advising them of the coming of the committee members and asking them to be prepared to discuss important problems with them. In some instances, he said, considerable time was wasted because appointments had not been made and members were unable to obtain interviews.

G. B. Powell expressed Mr. Riddle's regret at his inability to be present and stated that District No. 3 may be counted upon actively to carry out the committee work this year.

L. M. Brown stated that in his opinion the members through their visits receive the most benefit from the committee activities. In the work last year the managements of the properties he visited were glad to see the committee members and discuss their problems. While certain practices in operation on one property might not be applicable in just that form on another property, with modification they might be used on many properties. He spoke of the visits of electric railway men from various parts of the country to the property of the Interstate Public Service Company, and said that if individual

companies found it worth while to send their men out to visit other properties certainly the industry as a whole should benefit through the work of this committee.

W. H. Burke said that he is planning to divide District No. 6 so as to have members cover the entire territory. In Mr. Burke's opinion the idea of modernization and popularizing service should be stressed by the members in their visits. He also felt that the committee members should interest managements in competing for the Charles A. Coffin prize. Mr. Burke then told of attending the November meeting of the Midwest Electric Railway Association in Wichita, Kan., as a representative of the American Association. In an address at that meeting he attempted to acquaint the delegates more fully with the work of this committee.

The secretary read a letter from D. W. Pontius, in whose opinion the subjects covered during 1925 still furnished a large field for development and can be considered further in the order of their importance.

A. L. Hodges, New York City district, was absent. R. R. Hadsell stated that Mr. Hodges had arranged to hold a meeting of the members of his district on Jan. 27 and that he had made an allotment of the companies in the district to the members so that every company will be visited.

The secretary read a letter from D. E. Blair of the Canadian district, who stated that he had heard many favorable comments on the committee work from executives in Canada. He stressed the importance of properly editing the data collected by the committee and compiling it in convenient form for later reference.

J. W. Colton told the committee members that the information collected in 1924 and 1925 was now being published in a handbook of approximately 300 pages. Mr. Colton felt that a great deal of valuable information had been collected. Mr. Carbutt said that the American executive committee had underwritten the publication of the new handbook to the extent of \$3,000. He stated the book would be placed on sale at approximately \$2. Secretary Hecker spoke briefly about the handbook and said that it was planned to initiate an advertising campaign to promote the sale of the book. It was his belief that the book would be available for distribution within the next six weeks.

Labert St. Clair reviewed briefly the organization of the committee and said that the results of its work can already be seen, especially in the publicity and advertising activities of various companies throughout the country. Next to modernization Mr. St. Clair believes that selling service is the most important problem of the industry. He urged the members to go to the newspaper editors with the executives of the properties visited and get their viewpoints. He felt sure that the newspapers would be glad to publish any news which the committee members would give them and urged that such news be given local color. He also urged close co-operation with the Public Utilities Information Bureaus, of which he said there are 25 in 37

states. A recent survey made by Mr. St. Clair shows that in all but four states these bureaus are receiving support from electric railways.

Mr. St. Clair then spoke of the work of the advertising section of association headquarters. He said that in addition to the regular service rendered by the department it is always glad to give special service desired by a member company.

H. H. Norris represented the committee on education and outlined its objects and its plans for putting information into the hands of the members of the committee on management and operation, so that the latter might assist in promoting educational work. Mr. Norris said that four pamphlets are now being prepared for distribution to the committee on management and operation which will outline the reasons for educational work and tell how to start an educational program. He spoke of the foremen conference plan and the group conference plan, both of which are in effect on the Boston Elevated Railway.

The meeting was then opened to general discussion. In response to a query by Mr. Boyce, it was the general opinion that photographs and drawings should be obtained with contributions wherever possible, as these could be used should it be found that it is desirable to publish a supplement to the handbook.

Mr. Blunk felt that committee members should not fail to acquaint those whom they visit with the activities of the headquarters staff, and called attention to the vast amount of information available to members at association headquarters.

Reports from regional directors should be completed and forwarded to the secretary not later than July 1, said Chairman Carbutt, answering a question by Mr. Smith. They will serve as the basis of the committee report, which will be prepared by the advisory board, consisting of the regional directors. Mr. Carbutt said that contributions for the handbook should be sent in as promptly as possible and that these could be continued after July 1, since probably the publication of a supplement would be withheld until after the convention.

Mr. Kennedy called attention to the necessity of advising district managers of groups of properties of the coming visits of committee members so that district managers might check up with the local managers and assist in securing better co-operation.

Mr. Clifford stated that he was one of those at the last convention who disapproved of discontinuing this committee work. He said he believed that its activity offered greater possibilities than that of any other association committee. He spoke of the value of personal contact of its members with the managements of electric railways and also spoke of the value of educational work among employees. As to the work of the public utilities information bureaus, Mr. Clifford urged the members to send news to Mr. St. Clair to be passed along to the directors. Others who spoke briefly were J. Frank Johnson, W. W. Holden and C. J. Griffith.

At the conclusion of the meeting

Chairman Carbutt urged the regional directors and members to begin their work immediately. He said he hopes this year will be the most successful one since this committee activity had been initiated.

Poster Campaign for Manufacturers

WITHIN the next few weeks the special committee on co-operation with manufacturers will endeavor to impress on the public the fact that some 500,000 factory workers are employed in making electric railway materials in the United States. Posters for bulletin boards, stickers for letters



Labels of This Design Are Being Used in a Campaign Advertising the Industry

and express packages will be used to help carry this message. E. F. Wickwire, chairman of the committee, has circularized all manufacturer members, inclosing samples of posters, labels and stickers which will be supplied without charge in any quantity desired. All of them are of the general design illustrated above, the wording only being changed.

The outdoor sign feature of the campaign is being handled by the George H. Tontrup Corporation. Mr. Tontrup, as the only sign manufacturing member of the association, is co-operating with the committee in the preparation of a special sign, the wording of which is similar to that on the posters. The cost of these signs will range from \$35 upward, depending entirely upon the quality. All signs are of the same size, but some are illuminated and others are not.

Electric railway companies also will co-operate in this campaign by displaying posters in their cars and using stickers on their letters.

Claims Executive

ON JAN. 29 the executive committee of the Claims Association held a brief meeting in the office of J. G. Bruce, claim agent Indianapolis Street Railway. Those present were President J. H. Handlon, J. S. Kubu, L. F. Wynne, G. T. Hellmuth and H. K. Bennett.

Subjects for the October convention were considered. Several topics, including collection for property damage, vehicle regulation and other means for promoting safety, and use of moving pictures in claims work, were considered. It was decided to obtain expressions of opinion from all members of the subjects committee and all claim agents.

T. & T. Executive Committee

REPORTS of committees and the program for the October convention were the principal topics considered at a meeting of the Transportation and Traffic Association held at Indianapolis on Jan. 27.

For the accident prevention committee M. W. Bridges stated that a large meeting of the joint committee composed of Transportation and Traffic members and Claims members had been held the same morning. At this meeting the relations between Claims and T. & T. Associations had been taken up and arrangements had been made so that both would work together. The aims this year are to get out statistics that will do the most good in accident prevention work and hold a joint meeting of the two associations at the convention, with men from each discussing accident prevention work from the point of view of each department. Some years ago, said Mr. Bridges, a standardization of accident statistics had been attempted by the American Association, but it had not been found possible to standardize as to causes. The president was empowered to appoint a committee of four with two co-chairmen to get up a report on the subject. The sub-committee will send out questionnaires to collect statistics.

Several of the members spoke of accident classifications in use on their properties. Mr. Walker stated that on his road accidents are classified as avoidable and unavoidable. The number of avoidable accidents is an indication of the morale of the trainmen. Mr. Clifford said that on his roads accidents are classified in four groups. There is an honor roll for men having the best records. Mr. Powell said that in Louisville the costs of accidents are entered on each trainman's card. This record is kept up to within ten days of date. Mr. Clifford stated that in Texas on the Stone & Webster properties a campaign is being waged to show that the cost of accidents comes back on the car rider.

Labert St. Clair appeared before the committee and stated that as the Hoover conference will be finished next month, he will have time available for other work. He said he would like to have a poster campaign on safety and would be glad to prepare copy.

Mr. Stewart presented a progress report for the committee on bus operation. A list of some seventeen subjects which are being studied by this committee were discussed. Mr. Clifford said that if there ever was an opportunity to make progress for something that is popular this was the time. Care must be taken not to make the mistake of becoming tied down by a fare similar to the old flat street railway fare. The program of the bus operation committee was approved and President Clifford expressed his appreciation of the scope and thoroughness with which the work was being done.

Members present were G. H. Clifford, J. V. Sullivan, E. M. Walker, G. B. Powell representing Samuel Riddle and G. C. Hecker representing J. W. Welsh. Chairman M. W. Bridges of the accident prevention committee and J. B. Stewart, Jr., of the committee on bus operation were also in attendance.

Maintenance of Equipment

Four-Section Tower Truck

Power-Operated Tower May Be Raised or Lowered Either from the Driver's Seat or from Platform of the Tower Itself—Large Spotlights Provide Illumination for Night Work

BY J. R. BRITTAIN

Mechanical Engineer Los Angeles Railway, Los Angeles, Cal.

IMPROVEMENTS in a gasoline-propelled emergency line tower truck are proving of great assistance in speeding repairs and reducing labor. This emergency truck has just been built and placed in service by the Los Angeles Railway. It is stationed at a central point, is subject to call at all times and functions in much the same manner as fire department apparatus. When the alarm is sounded, operators receive directions by telephone and the city accords them the same right of way over traffic as fire and police vehicles.

To provide safe and rapid wire repairs a four-section power-operated tower has been adopted. Linemen can stand on the floor of the tower platform, protected by the railing, and work safely on trolley wire at its highest point. The tower can be raised much higher than old ones used by the company and can also be lowered farther to give additional clearance under low points.

The engine of the truck has a power takeoff consisting of a set of gears with housing. This is operated by the engine clutch. The power takeoff gearing has an individual shift lever and can be disconnected from the engine when the hoist is not in use. The tower is raised and lowered by a mechanical hoist driven by the power takeoff. The hoist consists of an interlocking worm with gearing which has a large speed ratio. The hoist is driven through a connecting shaft with a universal joint at the hoist and a flexible thermoid at the power takeoff end. The gear shift lever for raising and lowering the tower is placed conveniently beside the driver's seat, so that the tower can be raised or lowered to suit the lineman's requirements, while he still remains on top of the tower. This eliminates the necessity of a lineman getting down each time to help the

driver raise and lower the tower by hand power. The hoisting and lowering movements are protected by safety limit stops, which throw the shifting gear in a neutral position whenever the tower reaches its highest or lowest position.

In addition to the driver's control, the tower can be raised or lowered by the lineman while he is on the tower platform. This control is provided by means of a telescopic collapsible shaft made of four square seamless steel tubes, each fitting into the other and connected to the hoist gear shifting mechanism. By turning a crank the lineman on the platform raises or lowers the tower to the exact amount required.

The tower hoist cable arrangement consists of two steel cables attached to two large sheaves mounted on the hoist shaft. The cables pass over two smaller sheaves fastened to the upper members of the first section and the cable ends are anchored to the lower members of the second section. Four cables are attached to the chassis and then passed over four sheaves and are fastened to the upper members of the second section. The cable ends are anchored to the lower members of the third section.

Four cables are attached to the



The Tower in Its Raised Position Provides for Work on the Highest Part of the Line and the Workmen Are Protected by Railings

lower members of the second section and pass over four sheaves fastened to the upper members of the third section. These cable ends are anchored to the lower members of the fourth section. Heavy wire guards are placed around the first section to protect the cables and sheaves from possible damage by objects which may be forcibly thrown against the



The Emergency Truck of the Los Angeles Railway Presents a Neat Appearance and Is Arranged for Particular Convenience of Workmen

tower. These guards also prevent linemen from getting hands or feet caught while the tower is being raised or lowered.

The truck chassis is of 2-ton capacity and equipped with a high-speed engine. Large pneumatic tires are used. The driver's cab is built of steel and is furnished as a part of the chassis by the manufacturer. The truck body was specially designed and built for emergency service. Two lockers are placed adjacent to and back of the tower for the small tools. The remainder of the body is used for larger equipment, such as jacks, blocks, rope, chains, etc. The body floor was built high above the chassis to provide sufficient clearance for lockers to hold the fire hose bridge.

Electric red lights are placed on the front, side and rear of the body. Two large spotlights are provided for furnishing illumination during repairs. Warning sirens which are electric motor operated and a hand operated warning bell are installed on the cab. The new truck has been in service slightly more than four months and has proved of extreme benefit in keeping cars moving dur-

ing heavy peak loads. This is a very difficult problem in the city of Los Angeles, due to the great number of vehicles which use the streets through which the car lines operate.

Improved Axle Bearing Storage*

AXLE bearings in the shops of the Denver Tramway, Denver, Col., were formerly piled on a bench in groups by sizes and for various types of motors. This arrangement had the disadvantage that the bearings were not easily located and also that they presented an unsightly appearance. In order to improve this condition a large rack has been constructed which is divided into vertical and horizontal compartments. These are labeled with the type of motor and size of the bearing. Each compartment is provided with angle-iron slides so that the bearings are supported by the flanges or set upright on the bearing flange so as to rest on the angle irons.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

wheel independent of the other and assures traction on either wheel regardless of whether or not the other is free to spin.

The motor ventilation scheme is similar to that described for the generator. Ball bearings are used. Each motor has a nominal rating of 25 hp. at 250 volts.

The main controller has six operating positions, one for "forward" operation, one "off" position, three for "electric braking" and one for "reverse." These are so arranged that the controller handle is moved forward for forward operation of the vehicle, and backward for reversing.

The controller is hand operated. It is built so that it may be mounted under the operator's seat or at any other convenient place where the shaft can be connected to the handle by means of gears and shafting or bell cranks and linkages. The handle may be moved from "forward" to "off" or "braking" by a single motion, but cannot unintentionally be moved from "forward" to "reverse" or vice versa.

A field resistance controller has been designed for mounting on the steering column. It is provided with an extended handle so that it may be operated without removing the hand from the steering wheel. A roller running over a notched plate enables one to "feel" the positions.

The purpose of providing for increased resistance in the main generator field circuit is threefold. Overloading of the engine is prevented when its capacity has been temporarily reduced for some reason. It permits the engine to reach a high speed in a minimum of time and if the resistance is then reduced maximum accelerations are obtainable on severe grades or with heavy

New Equipment Available

Westinghouse Builds Gas-Electric Bus

THREE well-known manufacturers—the Westinghouse Electric & Manufacturing Company, Fageol Motors Company, and the American Car Company — have worked together in the construction of the latest gas-electric bus. The engine is a Hall-Scott, mounted on a Fageol chassis, motors and control are Westinghouse, and the body is of the Birney type built by the American Car Company.

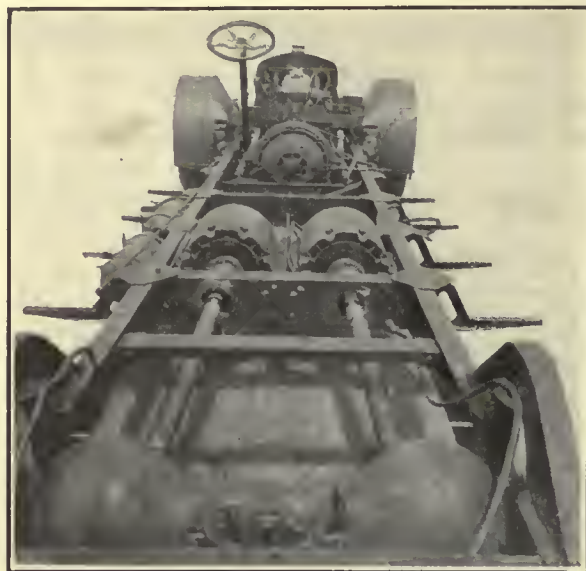
The electrical equipment consists of a shunt-wound generator, two motors, a main controller and a field resistance controller. The generator is direct connected to the engine through a flexible coupling. It is primarily a self-excited shunt generator, but is supplied with a small amount of separate excitation supplied from the 2-volt starting and lighting battery.

The generator is thoroughly ventilated and has a nominal rating of 53 hp. at 1,500 r.p.m.

Two interpole motors are used. They may be mounted in parallel or in tandem. When mounted in tandem they are connected together by means of a suitable flexible coupling and may drive the rear wheels through a standard automotive rear end. When mounted in parallel, a dual drive axle may be used. This permits one motor to drive one rear



New Westinghouse-Fageol Gas-Electric Bus on Exhibition at Indianapolis



At Left, Driving Mechanism Consists of Westinghouse Type V-91 Motors Mounted on a Single Chassis. At Right, Interior of the Body, Built by the American Car Company, Closely Resembles that of the Typical Birney Car

loads. It has also been found by tests that there is a "best" combination of engine speed, resistance, and grade, to obtain the highest vehicle speed.

A small toggle switch is provided to open the battery field circuit. It is arranged to be connected to the foot throttle and operates so as to close the circuit when the pedal is depressed and to open it when the pedal is released. This eliminates unnecessary battery discharge as would occur when coasting and when the vehicle is stopped.

SPECIFICATIONS OF NEW GAS-ELECTRIC BUS

Weight with passenger load.....18,000 lb.
Wheel diameter 30 to 36 in.
Gear ratio 8-12 to 1
Free running speed 30 to 50 m.p.h.
Schedule speed 15 to 25 m.p.h.

GENERATOR

One Westinghouse type 177, nominal rating 53 hp. at 275 volts, 1,500 r.p.m.

MOTORS

Two Westinghouse type V-91, nominal rating 25 hp. at 275 volts, 1,800 r.p.m.

CONTROL

One Westinghouse hand-operated directional and emergency braking controller.
One Westinghouse steering column field resistance controller.

This gasoline-electric coach was built in St. Louis and has recently been driven on an initial demonstration tour with very satisfactory operating results. Cities visited have been Terre Haute, Dayton, Columbus, Toledo, Detroit, Cleveland and Indianapolis. It was demonstrated to street railway and motor bus company officials in each of the cities visited. During the tour from St. Louis to and between the cities mentioned, the gasoline consumption has averaged 5½ miles to a gallon.

Improved Concrete Breakers

TWO new concrete breakers of improved type have just been announced by the Sullivan Machinery Company, Chicago, Ill. These are DW-221 and DP-221. The valve for these breakers is an improved modification of the pioneer Sullivan drill valve. Its outstanding characteristics are light weight, rapid action, positive control of the piston and hard, snappy blows.

The valve mechanism is secured in the chest by side rods which hold the valve buffers and the single leaf buffer springs in position. The valve buffers are round pieces of tool steel turned and heat-treated. The valve itself is made from alloy bar steel especially heat-treated to resist shock and breakage. A hood or deflector is provided as part of the

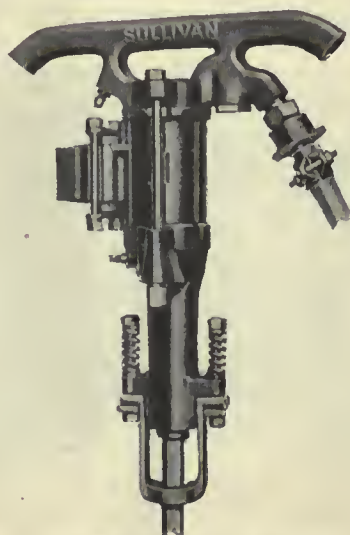
valve chest to throw the exhaust from the drill away from the operator.

The piston is made from bar stock of special alloy steel, ground after heat treatment to a close running fit in the cylinder. The forward end has a button turned on it, which lessens the possibility of upsetting and binding in the bushing if operated on poor shanks. The striking end is guided in a long bearing, which is a part of the cylinder.

The cylinder is a solid drop forging, machined, hardened and ground to exact size. The valve chest is not separate, but is a part of the forging. The bore of the chest is ground accurately and holds the valve chest bushings in which the spool valve reciprocates, so that in case of wear the bushing may be renewed without having to replace the cylinder. A dustproof chuck housing made from a solid drop forging bored out, hardened and ground incloses the chuck and chuck bushing. Lubrication of front end parts is by a tapped opening closed by a thumb plug.

The back head has an oil boss on top of the seat for the throttle valve. Oil can be poured into this chamber, which leads to the main inlet port. This carries oil through the working parts of the drill. A separate oil reservoir in the side of the cylinder provides an automatic oil feed through the main inlet port.

The DP-221 concrete breaker is a lighter type, fast-running tool, weighing but 41½ lb., while the DW-221 is a heavy-duty breaker, weighing 75 lb.



Type DW-221 Concrete Breaker

The News of the Industry

Draft of St. Louis Grant Under Way

The rough draft of the franchise under which the newly formed Public Service Company of St. Louis, Mo., will be asked to operate when it takes over the properties of the United Railways has been prepared by City Counselor selor Muench is merely to be used as a ler and his special franchise committee. The substance of the proposed ordinance will not be made public until it has been finally approved by the committee. The draft prepared by Counselor Muench is merely to be used as a basis of discussion by the committee of which Mayor Miller is chairman.

In a general way the agreement between the city of Montreal and its railway will be followed in the preparations of the new St. Louis ordinance. The terms of the Montreal franchise will, however, be changed to conform to local conditions in St. Louis, particularly with respect to the size of the car system and the problems that have developed since the Montreal bill was put into effect in 1918.

Seven-Cent Fare in Louisville

The Louisville Railway, Louisville, Ky., has been granted a straight 7-cent fare. The new rate became effective on Feb. 1. Tokens, which were sold at five for 30 cents, are being accepted as the equivalent of 6 cents, when an additional cent is added, this provision having been made to facilitate matters in the interest of the car riders. The old rate was 6 cents on tickets or 7 cents cash. Instead of tokens, paper tickets will be issued.

City Attorney William T. Baskett issued a statement to the effect that the added revenue will probably increase earnings of the company from \$300,000 to \$500,000 annually.

Under the ordinance passed in 1923, authority for the raise was granted the railway, members of the Board of Works said, after it had been shown that the barometer fund had dropped to \$36,000. The question of an increase in fare for the company came up for discussion when the Louisville Railway showed on Dec. 31, 1925, the earliest date a fare increase could be asked for, that the fund had depreciated to such an extent that operation to bring the fund over the \$200,000 mark, fixed by ordinance as the minimum, had not been successful.

Bound by the ordinance, the Board of Public Works had only to view the books of the railway, and, if it accepted the figures as kept by the company, the raise automatically went into effect.

The Board of Works objected to certain charges made against the fund and questioned the right of the railway to charge off depreciation and other ex-

penses which, it was claimed, should have been made against capital. On that question several conferences between the board and railway officials hinged.

At the same time accountants for the Public Utilities Bureau had other figures which they claimed would bring the barometer fund to \$175,000 with certain items carried off, and even held that under certain bookkeeping interpretations of the ordinance the fund would exceed \$200,000.

The question of the general plan to be followed by the company in making charges against the fund has been a subject of debate between the city and the company.

In the event the barometer fund reaches \$500,000 fares are reduced automatically by progressive stages.

Mayor of Tacoma Charged with Double Dealing

Internal disturbance in jitney bus circles at Tacoma, Wash., has come to an open rupture between Mayor A. V. Fawcett and George F. Vandever, Seattle, attorney and heavy stockholder of the Puget Transportation Company. Mr. Vandever accused the Mayor of playing politics with the jitneys and sacrificing the stockholders to further his own political interests. The Mayor branded these charges as false.

Incensed at the Mayor's statements, Mr. Vandever threw open the books of the company to show that the buses were operating at a loss. In fact, operation has failed to show a profit for a single month since the company was organized, a year ago last October. He denied, however, that he had threatened to suspend operation. According to Mr. Vandever, the company will continue to operate in the hope that it will be able to establish itself on a paying basis. In the future the Mayor will have no voice in the policy of the company. The buses are operated in Tacoma in competition with the railway lines of the Tacoma Railway & Power Company.

During the controversy the Mayor is reported to have said he "could close out the Tacoma Railway & Power Company tomorrow if I want to. But I can't until I find something to take its place. With 100 buses I can do everything the railway is doing, and run the buses further out."

Paving Relief Bill Introduced in New Jersey

Senator Abell has introduced into the Legislature of New Jersey a bill which would relieve street railways from paving expense except that incurred in construction or repair of tracks. The bill is favored by Public Service Railway.

Belated Moves Being Made at Chicago

Members of the local transportation committee of the City Council at Chicago hope to submit a tangible plan for the solution of Chicago's traction problem to the voters in the November election.

Whether the plan to be submitted will be based on a 50-year franchise to the surface lines at the expiration of the existing franchise on Feb. 1, 1927, or whether the plan will be so arranged as to provide the issuance by the city of terminable permits to the companies has yet to be determined by the committee.

If the voters approve the plan, it will be submitted to the Legislature, which meets early in January, 1927, for the needed enabling legislation, on which, in either case, the plan will be based. Between the time that the Legislature convenes and the date of the expiration of the railway franchises there are a few days during which the passage of the enabling measure may occur.

While Alderman McDonough, chairman of the local transportation committee, was discussing the probability of a tangible plan for submission to a vote in November, bankers representing the bondholders of the surface lines were announcing the personnel of the protective committees appointed to conserve the interests of the bondholders. Mr. McDonough said:

Inside of a few weeks we will have something tangible to work on—a rough draft of a traction ordinance being prepared by C. M. Doty and J. J. Coughlin, assistant corporation counsels, assigned to the committee.

If necessary the committee will meet every other day to consider this rough draft and work out a final solution to the problem. Whether the solution is going to be based on a city-issued permit or on a 50-year franchise will have to be decided by the committee. The committee, however, will have an ordinance ready for submission to the people at the November election, and based on the necessary enabling legislation, which is needed whether we have a 50-year franchise or the permit plan.

When Chicagoans approve this plan, we will submit it to the Legislature as an expression of the majority of Chicago's population and demand that the enabling legislation on which this plan is to be contingent be passed. This could be done before the ordinances expire on April 1, 1927, and in this way a receivership will be avoided.

So far as the general public is concerned the reported action by the bankers caused some misgivings. Largely on this account the bankers explained publicly that the appointment of bondholders' committees at this time was merely a matter of form and in preparation for the future. Until the payment of principal is actually defaulted, an event which cannot happen before Feb. 1, 1927, the bondholders cannot do anything. The personnel of the committees has been published before in the ELECTRIC RAILWAY JOURNAL.

Purchase of Taxis Is in Hands of Public Service Commission

Coleman J. Joyce, counsel for the Philadelphia Rapid Transit Company, Philadelphia, Pa., has petitioned the Public Service Commission for approval of the purchase of the capital stock of the Yellow Cab Company, Philadelphia. The price specified is approximately \$3,000,000. It is stated in the petition that this move is a part of the general program of bringing together the various transportation facilities of the city for the greatest good of the largest number of people. The railway regards a combination of this kind as an economic necessity.

The taxicab company's capital stock is represented by 5,000 shares and the price agreed upon covers several pieces of real estate which it owns. The sum of \$50,000 was paid by the P. R. T. at the time that the agreement of sale was made and the balance must be paid not later than July 1, 1926. A hearing will be fixed by the commission.

Plans Made for Great Northern Cascade Electrification

At Boston, Mass., which he visited during the week ended Jan. 30 to discuss matters related to the development of the Northwest and the forthcoming electrification of a new Cascade mountain tangent tunnel with Jackson & Moreland, consulting engineers, Ralph Budd, president of the Great Northern Railway, stated that the new tunnel will be about 7½ miles long. It is expected it will be completed in about three years. It will cost about \$10,000,000. More than 18 miles of grades and curves will be eliminated. This will permit a reduction of several hours in the running time of trains. Hydro-electric power from the road's existing plant will be used.

In connection with this tunnel the improvement in line will call for the electrification of about 25 miles of track. Single-phase transmission and the use of d.c. motors in driving the locomotives is contemplated.

Service Changes on Detroit Lines

The fare by railway to the village of Redford, which was recently annexed to the city of Detroit, has been fixed at 12 cents, or double the regular city fare, and a contract has been entered into whereby the Detroit Department of Street Railways is to use the tracks of the Detroit United Railway to the center of the old village of Redford.

Effective on Jan. 17 the Grand River car line was extended from Meyers Road, the old terminal, to Redford Center. The fare is 6 cents for the ride from the city points to Mill Road and 6 cents from Mill Road to Redford. Full transfer privileges are granted.

Coaches formerly operated on Grand River Avenue between Meyers Road and Mill Road have been discontinued and D.S.R. coaches are operated on Grand River Avenue from Redford Center to the Telegraph Road. As the bus fare is 10 cents, this arrangement allows passengers to travel from the Telegraph Road into the city for 22 cents. It has also been announced that bus service is to be furnished from

Brightmoor to Mill Road for 10 cents, giving residents of Brightmoor the same privileges as those of Redford.

According to the terms of the contract with the Detroit United Railway, the city department will pay the D.U.R. 10 cents per car-mile for each car operated over its tracks leading to Redford. The contract can be terminated upon 90 days' notice.

Hearing on Los Angeles Terminal Adjourned

The hearing on the application of the city of Los Angeles for an order of the Railroad Commission to compel steam roads in Los Angeles to construct the Plaza Union Passenger Terminal has been adjourned until March 2 to permit several different associations to present additional briefs and data. A hearing was held in Los Angeles before the California Railroad Commission on Jan. 4 and continued several days, but nothing of significance developed. At this rehearing the city of Los Angeles based its appeal on the decision handed down some time ago by the Interstate Commerce Commis-

206 Years of Safety Is Record of Seven Manchester Motormen

In the employ of the Manchester Street Railway, Manchester, N. H., are seven motormen who have established a remarkable record of 206 years of active service in the employ of the company without having been involved in an accident which resulted in any expense to the company. In this period of 206 years these men have operated their cars approximately 5,000,000 miles, or 200 times around the world. This record is a source of great pride.

William Tarr, the oldest in length of service, started work for the company on Feb. 19, 1886, is a veteran of the horse-drawn car days and has 39 years of service to his credit. James Herod is second in years of service. He began work with the company on April 1, 1892, and has 33 years to his credit. William Drennan started to work on July 1, 1893, and has more than 32 years to his credit. Both Mr. Drennan and Mr. Herod are veterans of the old horse-car days. John O'Sullivan began work 28 years ago on April 1, 1897, and Alphonse St. John started



Manchester's Honor Men

(1) John Kirk; (2) William Drennan; (3) John O'Sullivan; (4) James Herod; (5) William Tarr; (6) John Dugan; (7) Alphonse St. John

sion that the Southern Pacific, Union Pacific and Santa Fé lines should provide a union station for Los Angeles. This plan as proposed by the city called for the separation of several dangerous grade crossings that existed on the steam road and interurban lines entering the city. The steam road and electric lines in opposing the Interstate Commerce Commission's views on a union station have presented plans for a system of station facilities, elevated lines and grade crossing separations that is considered the logical solution to the congestion in certain sections.

One-Man Cars to Speed Up Service.—An experiment with one-man cars on the Dorr Street line of the Community Traction Company, Toledo, started on Jan. 17. The purpose is to speed up downtown operation by establishing a new plan of pay-enter inbound and pay-leave outbound. This will eliminate collection of fares in the congested area. The one-man cars have been operating on three other lines for many months.

one year later, on April 1, 1898. John L. Dugan started 24 years ago on July 5, 1901, and John Kirk 23 years ago on May 1, 1902.

When asked to comment upon this wonderful record, Thomas H. Kendrigan, superintendent of the Manchester Street Railway, pointed out that in his opinion the showing is due to the fact that all of these men are of a type which any community would be proud to number among its citizens. They have always lived up to the standards of the company. He said:

I have no recollection that any of these men was ever late for work. If I were asked to name the principal qualifications that go to make up a good motorman, I would name loyalty, co-operation and courtesy. All of these traits are characteristic of these men. I have never known one of them to be disagreeable to the public, or indifferent to the orders of the company. They have tutored practically all student operators on our lines within the last twenty years. By their devotion to their duties they have earned the respect of the officials of their company, and by the courteous and efficient manner in which they have conducted their daily work they have earned the trust and confidence of the public.

Rapid Transit Plan for Immediate Use Suggested at Detroit

The plan for "rapid transit" operation of street cars on main traffic arteries in Detroit, Mich., which was submitted to the City Council by Harry R. Miller and Nicholas J. Schorn, Detroit real estate men and engineers, has been referred by that body to the Department of Street Railways and the Rapid Transit Commission for study. The D. S. R. and Rapid Transit Commission were directed to report to the Council at the end of four weeks as to the possibilities of the proposed plan.

As has been explained previously in the *ELECTRIC RAILWAY JOURNAL*, the plan, known locally as the Miller-Schorn plan, was originally presented to the Council last year. Included in it are the following recommendations:

1. That four-track subways be built within the half-mile circle, designed for extension when the need arises.
2. That street cars can be operated as express trains outside this district, making stops every half mile or mile at depots placed in the center of the street, between the tracks, and reached from the sidewalks by underground passages.
3. That buses supplant the trolley cars in the slower, many-stop service.

The plan is advanced by its originators as the most practical and economical one for rapid transit offered in Detroit. They urge that recommendations 2 and 3 be put into effect without delay.

In commenting on the plan, H. U. Wallace, general manager of the D. S. R., stated that tests mentioned in the reports submitted by the plan's proponents, indicating a saving of more than twenty minutes by the use of the Miller-Schorn system on the Woodward Avenue line between Jefferson Avenue and the city limits, were made after midnight when traffic was light and that they might therefore be inaccurate.

Mr. Mitten Would Reorganize Labor Bank

An offer of \$1,000,000 for the rehabilitation of the Producers and Consumers Bank, Philadelphia, Pa., a labor institution, which closed its doors some months ago, has been made by Thomas E. Mitten, chairman of the Philadelphia Rapid Transit Company. The offer was accompanied by a comprehensive plan for reorganization, in which the interests of the stockholders and depositors would be fully protected. Albert M. Greenfield, receiver, favored acceptance of the plan, through which, it was said, losses to depositors sustained in the failure would be eventually recovered.

Employees at Detroit Protest Change in Hours

Although not entirely satisfied with the new arrangement of working hours at the Highland Park shops of the Detroit Department of Street Railways, the 500 employees who walked out at noon on Saturday, Jan. 23, were back at work again Monday morning.

Some time ago the men, who were not entirely satisfied with the wage scale, asked an increase in wages. After a survey of factory conditions in Detroit by Frank J. Denny, assistant to

H. U. Wallace, general manager, it was reported that the men were receiving a good hourly wage rate, but that they were working only 44 hours a week, whereas employees in factories on similar lines of work were employed 48 to 49 hours a week.

Following the findings of Mr. Denny, the general manager ordered that the men in the Highland Park shops be permitted to work on Saturday afternoon, thus increasing the number of hours per week to 48, the additional hours to be paid for at standard rates.

The department manager does not contemplate any alteration of the wage scale and apparently no further step is planned by the shop men.

Oklahoma Railway Affected by Withdrawal of jitney Rules

The transportation situation at Oklahoma City, Okla., was somewhat muddled Jan. 27 when city officers were ordered to discontinue enforcement of the ordinance governing bus operation in a restraining order issued by Judge Tom Chambers of the district court. This court order resulted from a suit filed against the City Commissioners by the People's Transfer Company, in which it was alleged that the Oklahoma City bus and jitney ordinance is "unreasonable, discriminatory and oppressive." Acting upon the strength of a previous decision upholding the ordinance the railway put on several buses to supplement its street car service.

The temporary restraining order threw down the bars for the establishment of jitneys on several Oklahoma City streets which are operating in competition with the Oklahoma Railway. This complicates the financial problem which the Oklahoma Railway has been facing since it went into receivership more than a year ago. The Oklahoma City ordinance, the enforcement of which is temporarily restrained, requires bus operators to pay an annual license of \$30 per seat on every bus. It also gives City Commissioners the right to specify the routes of bus lines and fixes a penalty of \$19 and cost for violation. Each violation counts as a separate offense, according to the ordinance.

A City Commissioner Sets a Good Example

Herman H. Green of the City Commission of Salt Lake City, Utah, in carrying out a plan announced by himself some weeks ago, has turned his commissioner's automobile in to the city garage. Commissioner Green is riding the street car to and from his office, and walks when it is necessary to go about town on city business. Mr. Green has taken this action in the interest of economy and reduction in automobile expense for the city. The commissioner's idea is that just enough cars to take care of the actual needs of the city should be kept for emergency business.

Accident Prevention Contest in Rochester

An accident prevention contest has been started by the New York State Railways, with the various divisions, lines, teams and individual trainmen of the Rochester city lines. Rewards will be given to winners and to all men operating 300 days without a chargeable accident.

The plan is to divide all motormen and conductors into teams of ten men each. The same percentage of extra men will be on each team. Teams will be picked so they will operate as near as possible an equal number of car-miles. Each member of the winning team having the fewest number of accidents during the year will be presented with a new uniform as a reward for his carefulness. Each motorman and conductor who operates his car for 300 days without a chargeable accident will be presented with a \$1,000 sick and accident insurance policy, good for one year. All accident records will be posted on the various bulletin boards in the carhouses, and banners or flags, which can be displayed in front of the carhouses, will be presented the first day of each month to the division operating the largest total of car-miles per accident during the preceding month. The contest will last throughout the year.

Name of Stone Mountain Cars to Commemorate Leading Men

Each of the five new interurban cars which will be operated on the Stone Mountain line by the Georgia Railway & Power Company, Atlanta, Ga., will bear the name of some distinguished citizen of the community.

The suggestion about naming the cars came from a patron of the line. It was eagerly adopted by officials of the company. Patrons along the Stone Mountain interurban have been asked to send into the company the name of some person after whom they would like to have a car named along with their reasons. The names are to be limited to those who have served the community and whose careers are now ended. The five persons receiving the highest number of votes in the contest will have their names placed upon the first five new cars. Other cars will be named as they are purchased and placed in commission.

Thirty-eight Years in Service

This coming spring Ellsworth E. Rhodes will celebrate 38 years of continuous service with the Poughkeepsie & Wappingers Falls Electric Railway, Poughkeepsie, N. Y. In the days when that company kept about 60 horses in readiness for service a young man who hailed from Clintondale became the driver of an old green car which left the carhouse and ran to the river, then back to the Poughkeepsie & Eastern Railroad. This man, now grown old in the service, recently spoke of his experiences with Mike, the utility horse; of the one-man car, not, in this veteran's opinion, an innovation, and the arrangements made with Vassar College girls to meet the "Mary Powell," bound for New York.

Survey at Springfield Progressing

The survey of the lines of the Springfield Street Railway, Springfield, Mass., by the committee of three is progressing rapidly. The committee consists of Engineer J. T. B. Woodruff of the Springfield, Mass., planning board; President Clark V. Wood of the Springfield and Worcester street railways and W. J. Flickinger, vice-president of the Connecticut Company.

To date the committee has the report of J. T. B. Woodruff. The paper reviews the problem of traffic control as it affects the operation of street cars, routing of cars, overcrowding of cars, track repairs and renewals, the elimination of unnecessary stops and the desirability of extending parts of the double-track system.

It is said that Mr. Woodruff recommends the repair and removal of a large part of the system and that he suggests a plausible solution for traffic control. Only the cars operated over the Longmeadow line are said to be so antiquated as to need to be replaced. This is a matter which is receiving the attention of the committee. A new standard car which is said to be favored is lighter of weight and lower of body than is the type in use at present. A model one-man, two-man car is being built by the Wason Manufacturing Company.

Expenditure needed to rehabilitate the system is placed at about \$1,000,000.

Quincy & Northeastern Receives Certificate

It is reported that the Quincy & Northeastern Railway, Quincy, Ill., has been granted a certificate of convenience and necessity to operate a line between Quincy and Monmouth, Ill. It is generally believed that the Quincy & Northeastern will be operated with electricity supplied from the Keokuk, Iowa, power dam. No right-of-way has been secured, but a preliminary survey has been made. Efforts to reach Charles H. Petsch, New York City, said to be president of the new line, were unavailing as Mr. Petsch was out of the city.

Commission Recommended for Newark

The creation of a Transit Commission in Newark, N. J., to consist of five representative citizens to serve without pay and have the help of an expert on traffic and transportation as consultant is favored by the Newark Chamber of Commerce. This action, taken at the regular meeting, expressed the approval of the Chamber on the report by a special committee on traffic, transit and transportation. After reciting the results of an extensive survey the committee suggested in its report that the commission be appointed by the Mayor with the authorization of the City Commission or the Legislature, and that the city appropriate \$60,000 for the commission's work. Mayor Raymond said he did not believe that the City Commission should delegate its power to a transit commission because the responsibility for what is done would rest eventually with the city officials.

News Notes

Rate Rehearing Denied.—The California Railroad Commission has denied a petition for a rehearing filed by the city of Oakland in the matter of the temporary increase in rates of the Southern Pacific Company for its trans-bay ferry and interurban electric railway service in Alameda County.

Fare Rehearing Sought.—The Pacific Electric Railway, Los Angeles, Cal., has applied to the Railroad Commission for a rehearing of its application for an increase of its local railway and bus fares in the city of Pasadena. Its application was denied recently by the Railroad Commission.

Radio Tells of Seattle's Service.—The Seattle Municipal Railway recently utilized the radio in Seattle, Wash., to advertise its service. An elaborate program of music, singing and talks was arranged by R. E. Furse, assistant to the general superintendent. Included in the program was a talk on "Operation of Seattle Municipal Railway," by D. W. Henderson, general superintendent.

Committee Opposes Increase in Speed Limit.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has been refused permission to increase the speed of its street cars from 15 m.p.h. to 20 m.p.h. by the public utilities committee of the Common Council. The committee felt that it would be unfair to grant this privilege to the railway when the speed of autos, buses and taxis is held by ordinance to 15 m.p.h.

Fare Increase Denied.—The Public Service Commission of West Virginia on Jan. 27 denied the increase in rates asked by the Wheeling Traction Company, Wheeling, W. Va. The commission held that the company did not present its case in a manner which would enable the commission to distinguish properly the interstate and intrastate business and therefore an additional charge could not be authorized. It was held by the commission that no competent evidence had been adduced by the railway to enable the commission to fix the present fair value of the company's lines and properties.

\$15,660 Safety Bonus Awarded.—The San Diego Electric Railway, San Diego, Cal., distributed at two meetings on Dec. 22 and 23, 1925, \$15,660 in safety-first bonus checks to 172 conductors, motormen and bus operators. In addition to the safety-first bonus, during 1925 an additional bonus amounting to \$7,079 was distributed to trainmen under a plan wherein it is possible for each trainman to earn \$5 a month as an award for courtesy, safety, neat appearance, accuracy and general efficiency. At a meeting the subject of the benefits of the third year of welfare work carried on by the company were discussed, and in addition Hamilton watches were awarded to two employees for twenty years of faithful service. Both were elected to membership in the twenty-year service club.

Transfer Charge in Mobile.—At a recent meeting of the Alabama Public Service Commission, held at Montgomery, Ala., permission was granted to the Mobile Light & Railroad Company for a 1-cent transfer charge where through street cars are transferred from one line to another and the passenger does not change cars. This change does not increase the present fare, but is in lieu of the existing traffic charge where passengers change cars. The railway company wanted the change in order to put on through cars to carry students to the new Mobile high school.

No Strike in New Orleans.—There will be no car strike in New Orleans, La. The vote cast in a recent referendum was 823 against and 697 for. The possibility of a strike came about through the dismissal of two conductors on the lines of the New Orleans Public Service, Inc. Oscar C. Pertuit was discharged, it was said, for circulating election propaganda during the recent contest for president of the union and Robert Martin for inciting the men against the company. Herbert B. Flowers, president of the New Orleans Public Service, Inc., said that representatives of the union had called upon him and asked that the two men be reinstated, but that he had said that the men had been dismissed in keeping with the agreement between the union and the company.

Fares Between Wellston and St. Charles Cut.—The Missouri Public Service Commission on Jan. 25 authorized the Missouri Electric Railroad, controlled by the United Railways, St. Louis, Mo., to place a schedule of reduced fares into effect between Wellston and St. Charles, Mo., effective on Feb. 1. Under the new order the fare will be 21 cents. The new rate means a saving of 10 cents for through trip riders due to a change in the zones on the line. The fare in each zone will be 7 cents or a token for each adult and 3 cents cash for children. The reduction was sought to meet bus competition. The private buses running from Wellston to St. Charles recently cut their fares below those charged by the street cars. The competition in this section was referred to in the ELECTRIC RAILWAY JOURNAL previously.

New Long Beach Line Opened.—The new Daisy Avenue freight line of the Pacific Electric Railway, Los Angeles, Cal., was recently dedicated to the development of the Long Beach Harbor. More than 600 acres of new Long Beach industrial territory will be opened up in the west side district. The line cost the railway \$237,000. It will develop territory that now lacks rail facilities and will shorten the freight operating haul to and from Long Beach and Los Angeles, 2.3 miles. Mayor Clark of Long Beach said that the construction of the new line showed the unbounded faith the Pacific Electric had in the future of Long Beach Harbor. The new freight line extends northerly along Daisy Avenue from State Street to a point of juncture with the Los Angeles-Long Beach main line at Los Cerritos. It is estimated that freight can be moved to and from Los Angeles over the new line in 90 minutes.

Recent Bus Developments

New York Commission on Buses

State Body with Jurisdiction Outside of New York City Cites Its Views

It seems apparent to the Public Service Commission of New York that the substitution of buses for electric railway lines which have ceased to be profitable or that operate in territories which may better be served by buses is inevitable. With the continued growth in the amount of business carried on by bus lines in the state, the commission sees the need for further authority for the regulation of these agencies. In the opinion of the commission there should be added to the present public service commission law an article specifying in detail the supervision which the Legislature desires the commission to exercise over bus lines. It says the necessity for legislation upon this subject is recognized not only by the commission and the general public but also by the operators of bus lines.

Two other recommendations upon this subject contained in the last annual report of the commission are renewed, namely, an amendment to Sec. 5 of the public service commission law specifying more in detail the authority of the Public Service Commission and the Transit Commission where a bus line is partly within and partly without the territorial limits of the city of New York, and an amendment of the railroad law which will permit street railways to engage in auxiliary bus business without the necessity of the formation of separate corporations for that purpose.

The commission sees the bus business gradually unfolding itself. It says that in the early development of the bus no attempt was made to co-ordinate lines. They were developed and operated as the immediate needs dictated and as the financial ability of the operator permitted. Too often the available capital was so slender that the equipment soon suffered from inadequate maintenance and in many instances the original operator disappeared, to be followed by an equally enthusiastic and poorly equipped successor. The past year, however, has presented a rather wholesome consolidation of a number of such lines into systems extending over wide areas, back of which there are adequate financial resources to permit the lines to be efficiently and successfully operated. The close of the year finds these lines just beginning to function at their best. In the next season there is every reason to believe there will be a further consolidation with wider extensions which will ultimately provide the state with a class of service of the first order.

At one place in its comment the commission says:

Within the state bus operation has superseded electric railways in Newburgh (except partially for a short period in the summer when passengers are transported to

Orange Lake Park), in Middletown, in Glen Cove and in Port Jervis. In Albany, Troy, Utica, Rochester, Buffalo, Auburn and Watertown electric railway service has been superseded in part by bus service, either through extension of lines or creation of new lines.

Service to University Supplied by Baton Rouge Company

More than an ordinary public service is being supplied by the Baton Rouge Electric Company to the new Louisiana State University in Baton Rouge, La. The route is 2.6 miles long, of which 2.43 miles is over a hard-surfaced highway. Service by bus was started immediately upon the completion of the paving work on the Highland Road about three months ago.

The bus equipment consists of three 29-passenger Mack-Birney safety buses, two of which are in service from 6 a.m. to 8 p.m. on weekdays, while the third is used in tripper service between 7 a.m. and 8 a.m. and 11:30 a.m. and 1:30 p.m. On Sundays, when no students are handled, one bus furnishes a 30-minute headway, whereas a ten to fifteen minute headway is furnished on weekdays. The bus equipment represents an investment of about \$9,000 for each vehicle. Costs approximate 16 cents per bus-mile. Licenses and taxes average yearly about \$200 per bus.

During November the company handled 24,700 passengers. About 25 per cent of these were hauled between 7 a.m. and 8 a.m. during the rush for 8 o'clock classes.

The railway fare in Baton Rouge is 5 cents, but the bus fare is 10 cents including transfer privilege. Transfers from street cars are honored on the buses upon the payment of an additional 5 cents in cash. Transfers are issued from buses to street cars without additional charge.

The Louisiana State University has outgrown its accommodations in the heart of town. It was recently moved to a new site just outside the city limits. The new development contemplates an ultimate outlay of \$7,000,000. More than 1,600 students are enrolled. At present all students live downtown, pending the completion of the dormitories.

De Luxe Bus Service Proposed for North Jersey

Proposals have been made by the Public Service Transportation Company to establish de luxe bus service through certain high-class residential districts in North Jersey. The plan contemplates operation of parlor car buses providing a seat for every passenger at a fare higher than that of the street car. One of the districts which it is proposed to serve in this manner is the Forest Hill section of Newark, lying between the Mount Prospect Avenue car line and Branch Brook Park. A considerable part of this district is several blocks away from present service of the Public Service Railway. Some years ago bus service was attempted by an independent company operating at a 10-cent fare. The schedule speed was comparatively slow, however, and the service never achieved any great degree of popularity. Objection was made by some of the residents to the noise created by the buses. After some months trial this service was discontinued.

Another proposed line would serve the northern section of Glen Ridge, a suburb of Newark. A large residential district has been built up some distance from the nearest car line and it is proposed to furnish direct service between this district and the downtown section of Newark.

Limitations to Bus Operation.—The Gardner-Templeton Street Railway is operating buses between West Gardner Square and the Templeton town line, but is not permitted to pick up passengers bound for West Gardner or for Baldwinville, Mass. This restriction protects a private line which operates between Gardner and Winchendon.

Twelfth Line Started.—The twelfth bus line installed by the Philadelphia Rapid Transit Company, Philadelphia, Pa., within the last year started its first bus on Jan. 31 connecting Frankford, Olney, East Germantown and Chestnut Hill. During rush hours buses will run at intervals of two or three minutes, with a ten to fifteen minute schedule during the early hours of the day and a late night schedule of 22 minutes. The new line will provide a crosstown service for workers and students. A 10-cent fare with the 3-cent exchange privilege to and from all connecting surface lines is charged.



Students en Route to University

Buses for Light Hours.—The Public Utilities Commission has approved the petition of the Connecticut Company to discontinue railway service in Bridgeport, Conn., for a total distance of $\frac{1}{2}$ mile except that at specific times service will be supplied over part of this route. The company will operate buses during the hours of off-peak traffic.

Seeks to Operate in Millbury.—Officials of the Worcester Consolidated Street Railway have asked the selectmen of Millbury, Mass., for permission to operate buses within the town limits. Bus concerns which asked for permits were turned down because the Selectmen felt the railway should be given first consideration. The railway is operating two buses to serve the Speedway and Tatnuck Square districts in that city. Both sections have been without transportation facilities. The regular 10-cent fare is being charged. Passengers are permitted to transfer between bus and trolley.

Refuses Bus Substitution.—The Alabama Public Service Commission on Jan. 27 denied a petition of the Alabama Power Company to abandon a portion of its car tracks in Montgomery and substitute a bus line. In denying the petition the commission established a policy of declining to entertain such petitions until the municipal authorities have expressed their opinion. The Alabama Power Company sought to make the change as a measure of economy, but the citizens protested. The company failed to get a statement from the City Commission and then resorted to the Public Service Commission.

Enlarges Service.—The East St. Louis & Suburban Railway, East St. Louis, Ill., through its affiliated company, the Red Line Company, has extended its bus service into St. Louis from Collinsville, Ill. The new service will be from St. Louis to Greenville, Ill. The buses formerly operated only between Greenville and Collinsville. Two 29-passenger buses are being used in the service.

Purchases Independent's Rights.—Unable to secure authority from the Indiana Public Service Commission to operate a bus line between Hammond and Indiana Harbor, Ind., because of the existence of one line in that field, the Gary Railways took another step in the unification of northern Indiana bus routes by purchasing the certificate of the Blue Safety Coach Company of Indiana Harbor to operate between the two points.

Line in Pennsylvania Acquired.—The West Chester Street Railway, West Chester, Pa., which owns and operates the unified railway and bus system known as the Chester Valley Lines, has acquired the bus line between Pottstown and Reading from the Reading & Pottstown Bus Company, which will be operated as part of this system. The consolidation will enable the Chester Valley Lines to provide direct bus service from Reading to Norristown and from Wilmington, Del., to Reading, through West Chester and Pottstown. The extent of the use of the bus by this company has been the subject of review before in the ELECTRIC RAILWAY JOURNAL.

Financial and Corporate

Cincinnati Results Promising

First Two Months Under New Service-at-Cost Grant Show Small Balance—President Draper Discusses Buses

After all expenses, rental, interest and return on capital the Cincinnati Street Railway, Cincinnati, Ohio, earned \$6,774 for the two months period ended Dec. 31, 1925. This fact was disclosed in the report by President Draper, which reviewed operations since the company took over the operation of the street railway system from the Cincinnati Traction Company on Nov. 1 last. Mr. Draper said that having in mind that the essence of a service-at-cost franchise was that only a sufficient revenue could be secured to pay the operating cost, taxes, fixed charges and return on capital, it was apparent from the results obtained in the two months his company had been operating that the 8 $\frac{1}{2}$ -cent fare provided sufficient revenue to meet these requirements and a small surplus in addition. The report for the two months shows the following result:

	November and December
Operating revenue	\$1,239,313
Operating expenses	847,858
Net operating revenue	391,455
Taxes	123,369
Operating income	268,085
Non-operating income	2,956
Gross income	271,042
Rental, interest and return on capital	264,268
Balance	\$6,774
Total revenue passengers carried	14,446,892

Mr. Draper referred to the increase that occurred in the number of revenue passengers carried compared with the period that preceded the beginning of operation by his company on Nov. 1 at the reduced rate of fare. The number riding in the last two months of 1924 under the old plan and at the higher rate of fare averaged 6,879,025, while the number of revenue passengers riding in the last two months of 1925 under the new operations was 7,223,446. It was the hope of the officials, Mr. Draper said, that they may so operate the railway as to be able to continue the lower fare charges.

On the matter of bus transportation Mr. Draper said that the city authorities have under consideration his company's application for four bus lines from the center of the city to outlying suburbs, two crosstown bus lines and two connecting or feeder lines. It was the opinion of the company's officials that the public could be best served by a unified transportation system. The lines now proposed to be operated by the company formed the nucleus of a bus system to be developed as needs require and routes have been selected with a view toward their permanent operation rather than with the idea of competing with existing rail or bus lines.

Five new directors were added to the board of the Cincinnati Street Railway at the recent meeting of the stockholders. The new directors were: James M. Hutton, president of the Cincinnati Chamber of Commerce; Attorney John B. Hollister, Albert Benham, vice-president of the company; J. B. Stewart Jr., general manager, and C. V. Link, treasurer.

Passenger Traffic on Increase—Figures of Fares and Wages

Passenger traffic on electric railways continued to increase during December, 1925, compared with December, 1924, although at a somewhat retarded rate. This retarding of the rate of increase is undoubtedly due in part, according to the American Electric Railway Association, to the unusually heavy traffic carried in December, 1924, when there was a very sharp increase over November. The number of passengers reported by 209 companies for December, 1925, and 1924 was as follows:

December, 1925	839,574,559
December, 1924	827,894,938
Increase, per cent	1.39

For the calendar year 1925 compared with 1924 the number of passengers carried by these companies is as follows:

1925	9,395,058,568
1924	9,433,386,205
Decrease, per cent	0.41

Average cash fares (in cents) in 272 cities of 25,000 population and over:

Jan. 1, 1926	Dec. 1, 1925	Jan. 1, 1925
7.6066	7.5882	7.4926

Average maximum hourly rates (in cents) paid motormen and conductors in two-man service by companies operating 100 or more miles of single track.

	Jan. 1, 1926	Dec. 1, 1925	Jan. 1, 1925
Average hourly rate	56.30	56.30	55.87
Index No. (1913 = 100 per cent)	206.61	206.61	205.03

Merger Move Under Way in Indiana

Samuel Insull and Randal Morgan have approved a plan under which Halsey, Stuart & Company, as readjustment managers, will propose to the security holders of the Central Indiana Power Company and its subsidiaries and to the Terre Haute, Indianapolis & Eastern Traction Company and certain subsidiaries a readjustment of their securities so as to enable the consolidation of these properties into the Indiana Electric Corporation. This will bring the electric light, power and traction business of central northwest Indiana under one large operating company with ample financial and physical resources to provide the best electric light, power and traction services at the most reasonable rates consistent with

the interests of the company and the public to that part of Indiana.

The common stock of the Indianapolis Street Railway, which operates the street railways in Indianapolis, is owned by the Terre Haute, Indianapolis & Eastern Traction Company, but it is not intended to include the street railway in the merger, not at this time at least. Both Mr. Insull and Robert I. Todd, president of the Indianapolis Street Railway, are quoted to this effect.

The purpose of the deal is to provide for an adequate and constant supply of electrical energy to meet the anticipated future demands, to improve the service to the public and to eliminate the intricate financial structures brought about during the growth of the properties by the creation of numerous corporations, associated through ownership or control of stock or otherwise, and to furnish a satisfactory basis for the future financing which the development of the territory will require.

For a number of years Indianapolis has been handicapped by the lack of power with which to move cars when the peak loads were encountered. The need is for a central supply station of greater capacity than exists now on the properties of either the Indianapolis Street Railway or the Terre Haute, Indianapolis & Eastern Traction Company.

As indicated in the *ELECTRIC RAILWAY JOURNAL* for Jan. 30, Mr. Insull was reported to have said that the interests he represented were not going into the consolidation primarily from the traction point of view, but that with their traction lines in northern Indiana and the Interstate Public Service Company's line from Indianapolis to Louisville, closer traction relations were certain, with through interurban service at high speed possible from Chicago to Louisville.

Suburban Line May Go to Cincinnati Railway

The last link in the unification of the electric railway system at Cincinnati, Ohio, by the Cincinnati Street Railway will be accomplished if the stockholders of the Cincinnati & Hamilton Traction Company approve the plans set forth in a letter mailed to them. The letter is signed by Samuel Assur, president of the Cincinnati & Hamilton Traction Company. It states that the Cincinnati Street Railway has agreed to give 20,000 shares of street railway stock for the properties. The approval of this plan was recommended by the directors of the Cincinnati & Hamilton Traction Company, after a committee representing the common and preferred stock holders had devised a plan of distribution to the shareholders. Stockholders of the company are to meet March 4 to discuss the offer.

The plan calls for the distribution of 80 per cent of the Cincinnati Street Railway stock or 16,000 shares to the preferred stock holders. The remainder will go to the common stock holders. The time limit for acceptance of the offer is March 31. The present plans call for the transfer of the properties to the purchasing company on April 1.

If the stockholders approve the plans the Cincinnati & Hamilton Traction Company will be liquidated.

The letter to the stockholders is as follows:

The franchises held by your company in the villages of Wyoming, Lockland and Glendale have expired and despite negotiations with said villages by officers of your company and officers of the Ohio Traction Company and the Cincinnati Street Railway said franchises have not been renewed on a basis acceptable to this company or to your lessee, the Cincinnati Street Railway.

Under the lease from your company to the Ohio Traction Company, which was assigned to the Cincinnati Street Railway, on Nov. 1, 1925, the Cincinnati Street Railway has the right to discontinue operation of your lines and refuse to pay rental in the event of the failure of your company to secure renewals of franchises acceptable to the lessee or which arbitrators may decide should be accepted by your lessee. In the event of the exercise of such right the Cincinnati Street Railway would have

the right to demand payment from your company for all improvements and betterments made to your property by your lessee during the term of the operation of your property by the said lessee.

The lease for the operation of the Cincinnati & Hamilton Traction Company's property was assigned to the Ohio Traction Company by the Cincinnati Interurban Company in July, 1905. The lease was taken over by the Cincinnati Street Railway last November along with the other electric railway properties held in Hamilton County by the Ohio Traction Company, which were operated under the name of the Cincinnati Traction Company.

The Cincinnati & Hamilton Traction Company has 36.24 miles of single track. The lines extend from the Zoo to Glendale and Hamilton with a branch at Lockland.

Some Fine Points at Issue

Court to Settle Dividend Payments by Eastern Massachusetts—Public Trustees Praised—Did They or Did They Not Divert Too Much Money to Improvements?

AS MASTER in the suit by L. Sherman Adams against the Eastern Massachusetts Street Railway, in which Mr. Adams claimed \$24 back dividends were due to the holders of common stock on each share and \$5 due the adjustment stockholders, Judge Frederic H. Chase has filed his final report with the Supreme Judicial Court. This report is not materially changed from the original draft reported last October. It supports the contention that the company has earned enough to pay the dividends. His report sets forth in much detail the financial operations of the company, and the present conditions. It leaves only the question of law unsettled, and that is whether the board of public trustees has the discretionary power to withhold the dividends, to be applied to the upbuilding of the property. On that point the case will go to the full bench for argument in March.

Judge Chase finds that the true surplus was \$3,632,450 on Dec. 31, 1922, and \$4,343,141 on Dec. 31, 1924; that on Dec. 31, 1922, the liquid assets exceeded capital stock, bonds and obligations representing capital investments by \$5,071,564, and that in addition the company then had in its treasury in liquid form a reserve fund of \$500,000 applicable to the cost of service and unmatured bonds and equipment notes of the company which it had bought in and held uncanceled in the treasury, amounting to more than \$1,600,000, and that on Dec. 31, 1924, it had the same reserve fund of the same amount and unmatured bonds of the company purchased and held in the treasury uncanceled of a par value of \$1,981,000, and in addition to these funds it then had liquid assets of \$3,597,284, in excess of its capital stock and capital obligations.

In this connection he points out that up to Dec. 31, 1924, the outstanding funded indebtedness of the company had been reduced \$6,221,102 by payment and by purchase of bonds and equipment notes.

Judge Chase finds also that there

had been expended and charged to operating expense \$1,920,835 to Dec. 31, 1922, and at least \$2,920,000 to Dec. 31, 1924, which should have been charged to an asset account; that there has been expended to Dec. 31, 1924, for additions and improvements \$5,079,249; that the capital expenditures for rehabilitation carried as an asset amounted to \$539,044 Dec. 31, 1922; that the total charges to operating expense for accrued depreciation to Dec. 31, 1924, amounted to \$4,778,042, and that the balance of the accrued depreciation account carried as a liability Dec. 31, 1924, was \$2,432,331; that represented by cash or investments on the asset side of the balance sheet, there was charged to profit and loss for losses on road and equipment retired to Dec. 31, 1924, \$275,546, and to operating expense for road and equipment retired over \$800,000; that the road and equipment as a whole are much improved in efficiency and earning power over what it was when the trustees received it in 1919, and the value of the property as a whole for operating purposes is greater today than it was in 1919.

Regarding earnings Judge Chase says:

The operation of the road has yielded enough income to meet proper maintenance and all other operating expenses, pay taxes, rentals, interest on all obligations, dividends on the preferred stock and 6 per cent on the common stock, make adequate allowances for depreciation, obsolescence of property, rehabilitation, and losses in respect to property sold, destroyed and abandoned, and defray all other charges which properly may be made against income or surplus.

He finds that the trustees charged to operating expense expenditures which were described by the company as additions and improvements and which were allowed as such by the Department of Public Utilities, amounting to \$63,009, and he disallowed a claim of the trustees that reserve should be held on the liability side of the account to meet an estimated expense of \$25,000 "for counting, canceling and burning old bonds," finding that "no claim of this kind has as yet

been presented, however, and I am unable to see how such a large expense can reasonably be incurred for services of this character. I am allowing, therefore, a reserve of only \$1,000 for this purpose."

Judge Chase says that the trustees have always considered that dividends on all classes of stock are included in the cost of service, and that they have been mindful of this in fixing rates of fares. Their contention is, however, that notwithstanding this, the provisions of the act, they have not been able to get enough revenue from fares to enable the company to pay dividends on the common stock. The trustees take the position that their right to apply income to rehabilitation of the road is not limited to depreciation accruing after the new company was incorporated, but includes large depreciation which accrued before that time while the road was being operated by the Bay State Street Railway and by the receiver. The report says:

If the statutes are to be so construed, that the trustees are to operate the property and maintain it at the condition it was in when received, and are not to improve or increase its capital value out of income until they have paid all cost of service, including dividends, then I find that the dividends have been earned. Revenues have been sufficient to cover the full cost of service, as defined in the act, including dividends.

If, however, the statutes are construed to mean that the trustees have discrimination in the matter of declaring and paying dividends and may improve and increase the capital value of the assets of the company before dividends can be said to have been earned, as may directors of ordinary business corporations, the question takes a different aspect, involving consideration not only of the amount of income received, but the disposition made of it for various purposes and its distribution among various accounts.

As to the wisdom of the trustees in their use of the funds the report says:

When the trustees took possession the road was in poor condition in many respects, and no reserve depreciation had been accumulated. Since then, as before stated, the trustees have greatly improved the operating lines and their equipment. They have replaced worn-out rails and ties, improved the rolling stock and other equipment, reduced the cost of operation and increased the efficiency of the system as a whole. The trustees have been, and are, men of integrity and business experience. They have in large measure left questions of policy and active management to their chairman. The chairmen have been individuals of experience and ability who have endeavored to manage the company for its best good as they saw it. Whether they have misconstrued their duty toward the stockholders with respect to dividends seems to be largely a question of law. If this were a business corporation, organized under the general provisions of law, there might be little doubt as to the propriety of their conduct, inasmuch as the company has been honestly managed, its assets prudently conserved, and earnings put back into the property have enhanced its capital values. With this corporation, however, under the provisions of the special act, the questions involved may depend upon different principles.

The report of Judge Chase concludes with the statement:

So far as shown by the evidence, without regard to increase in population of the district served by the company, as to which no testimony was introduced, I find that it is reasonable to believe that the present net return on the property will continue during the period of public control. The road is in excellent condition and seems to be on a basis sufficiently sound to assure, with good management, the continuation of a net revenue substantially equal to the present yield. It is true that the gross earnings show decreases, but the net operating revenue has been stabilized by economies, and has been maintained without great variation since 1921 even with reduction in fares.

Denver Tramway Has \$284,790 Net for Six Months

The Denver Tramway Corporation, Denver, Col., successor to the Denver Tramway Company, has published its earnings for the period of six months ended Dec. 31, 1925. The surplus earned, after paying 5 per cent on the preferred stock, was \$20,819 applicable to an additional 2 per cent, it being understood, by agreement, that the company will pay 7 per cent if possible. The successor company at Denver stepped in on July 1 so that the report covers the first six months of the corporate life of the new company. The statement follows:

DENVER TRAMWAY EARNINGS FOR SIX MONTHS	
Operating revenue	\$2,230,929
Operating expense	1,491,165
Operating income	\$739,763
Miscellaneous income	30,014
Gross income less operating expenses	\$819,778
Deductions for taxes and interest	534,987
Net income	\$284,790
Profit and loss charges	3,560
Surplus after profit and loss charges	\$281,229
Preferred dividend requirement at 5 per cent	260,410
Surplus after preferred dividend at 5 per cent	\$20,819

Suit to Foreclose Hartford & Springfield Issue

Harrison B. Freeman, receiver of the Hartford & Springfield Street Railway, Warehouse Point, Conn., has been made defendant, along with the company, in court proceedings instigated by Ernest E. Rogers looking to foreclosure action against the railway. Mr. Rogers is trustee for the holders of \$600,000 of the railway bonds. Action to foreclose was suggested by Judge A. L. Brown so that the railway could be reorganized.

Lucius F. Robinson, counsel for Mr. Rogers, states that the bonds, issued July 1, 1901, have been long overdue and in default. It is further brought out that two-thirds of the holders of these bonds have made demands for foreclosure action. The specific issue of bonds on which the present action is based covers the properties of the company in Enfield, East Windsor and South Windsor. Since these bonds were issued the railway has acquired franchise rights in a number of other towns. Interest on the bonds has not been paid since July 1, 1918.

New Directors Chosen.—John A. Kelley, president of the First Citizens Corporation of Columbus, has been chosen director of the Columbus Railway, Power & Light Company, Columbus, Ohio, in place of Walter B. Beebe, now on a European tour. Edward G. Borer, Philadelphia, has succeeded B. C. Denman, Davenport, Iowa, as a director.

Partial Abandonment Approved.—The Public Service Commission approved on Jan. 29 a declaration of abandonment of the portion of the route of the Binghamton Railway,

Binghamton, N. Y., in Johnson City from Floral Avenue to Riverside Drive along Ackley Avenue, Union Street and Burbank Avenue. The resolution was adopted by the directors Dec. 1, 1924, and by the stockholders of the company May 15, 1925. The commission has determined that the operation of this part of the route was no longer necessary for the convenience of the public.

Seattle's Tax Issues Deferred.—Hearing on one phase of the litigation over the 1919 street railway tax between Seattle, Wash., and the Puget Sound Power & Light Company, which was set for Jan. 27, has been postponed until March, Corporation Counsel T. J. L. Kennedy has been informed by the clerk of the U. S. Supreme Court. The Old Colony Trust Company's part in the case was to have been heard this month.

\$200,000 Issue for Improvements and Obligations.—The Shreveport Railways, Shreveport, La., recently filed an application for an amended charter. This amendment, officials stated, authorizes the issue of \$200,000 of preferred stock, in addition to present capital, to be used in making improvements to present property and liquidating outstanding obligations.

Income Lower.—For the six months period ended Dec. 31, 1925, the passenger revenue of the Brooklyn City Railroad, Brooklyn, N. Y., was \$5,688,734, against \$5,704,133 for a similar period the year before. After the consideration of operating expenses and taxes as well as income deductions a net corporate income remained of \$721,516 for the six months ended Dec. 31, 1925, against \$739,938 for the six months period ended Dec., 1924.

New Directors in Jamestown.—Alfred A. Anderson and Fred B. Tinkham were named recently members of the board of directors of the Jamestown, Westfield & Northwestern Railroad. They are local merchants of Jamestown, N. Y. The choice of these merchants is in line with the company's idea of enlisting the aid of manufacturers in insuring continued operation.

Offers to Pay for Abandonment.—The Tri-City Railway has agreed with the city of Rock Island, Ill., to pay the municipal public benefit fund \$7,000 in consideration for right to abandon its Fourth Avenue double-track line from First to Fifteenth Streets, Rock Island. The agreement became part of the record of the hearing before Frank D. Ayres of the Illinois Commerce Commission. The railway will remove the tracks, fill in with rock to bring the avenue to grade and furnish the money for curb along a proposed boulevard down the avenue.

Seven-Mile Alabama Line Dismantled.—The tracks, trolley wires and poles of the old North Alabama Traction Company in Decatur and Albany, Ala., are being dismantled. Thus the last visible traces of the railway system are being removed from these two north Alabama cities. Some months ago service was abandoned on the lines in Decatur and Albany, Ala. At that time officials of the company said the railway no longer paid owing to automobile and taxicab competition.

Legal Notes

ALABAMA—Assessment for Paving on Railway as Abutting Property Owner

A railway bought an easement 25 ft. wide in undeveloped territory on which it built its track. Several years thereafter the city obtained a strip of land on each side of this easement and dedicated these strips for public streets. Later, these strips, but not the railway right of way, were paved, and the railway company was assessed about half the cost of paving as an abutting property owner. When it refused to pay, the city threatened to advertise its right of way for sale. The court held that an assessment for street improvement against such a right of way could not be enforced by sale, so was unenforceable, though leaving a cloud on the title of the railroad, which the latter could require it to be removed by mandamus. The case was differentiated from that of the Alabama Traction Co. v. Selma Tr. & Sav. Bank (104 So. 517) which gave the municipality the right to assess the railroad for the cost of street paving laid between its rails and 18 in. on each side. [Alabama City et al. vs. Alabama Power Co. 160 Southern Rep., 39.]

ARKANSAS—Act Requiring the Company to Pave Held Valid.

In 1923 the Legislature passed an act requiring a certain railway company to pay for paving between its rails. The company was operating under an indeterminate permit. Although the act was a special act, it was held valid by the Supreme Court. [Fort Smith L. & P. Co. vs. Board of Improvement, 276 Southwest. Rep., 1012.]

FEDERAL COURT—Conditions of Issue of Certificate to Interstate Carrier.

A motor truck company, which claimed it was not a common carrier, appealed to the Federal Court for an injunction to prevent the Public Utilities Commission of Ohio from interfering with its use of the highways of that state in both interstate and intrastate business. The District Court for the Southern District of Ohio held that the Commission had not denied an interstate certificate and that it was justified in denying the intrastate certificate as the carrier had failed to permit himself to be classified as a public carrier. The District Court also held that a State may exact compensation for the use of its highways by interstate carriers, provided the charges are reasonable and uniform, but that a requirement for the carrier to file a satisfactory liability insurance policy or bonds upon terms specified is not applicable to interstate traffic. [Red Ball Transit Co. vs. Marshall, 8 Federal (Second) Rep., 635.]

FEDERAL DISTRICT COURT—Workman on Uncompleted Part of Station Not Engaged in Interstate Commerce.

A workman engaged to clear up debris during the construction of a

stairway to a station on a road engaged in interstate commerce was injured. At that time the stairway had not been completed, and the employee was held not to be engaged in interstate commerce. [Clemence vs. Hudson & M. R.R. Co., 8 Fed. (Second) Rep., 317.]

FEDERAL SUPREME COURT—Reasonable Extensions of Service Only May Be Required by Public Service Commission.

The court will not substitute its own judgment for the determination of a public service commission as to what extensions of the service of a public utility company may be required as reasonable but the court will consider the investment required to make the necessary service extension and the effect of the new service upon the company's income. Then, if it appears that the power to regulate results in an infringement of the right of ownership, the order of the commission will be held invalid. Under the guise of regulation, a state may not require a public service company to make large expenditures for extensions into new territory when the necessary result will be to compel the company to use its property for the public convenience without just compensation. [People ex rel. Woodhaven Gas Light Co., vs. Public Service Commission of New York, 46 Supreme Court Rep., 83.]

FEDERAL SUPREME COURT—Utility, with Franchise Calling for Inadequate Rate, Not in Position to Maintain Suit to Enjoin Enforcement of that Rate.

A water company operated on a 40-year franchise which provided for a schedule of prices for water. After the appointment of a state utilities commission which was given control over rates, the water company applied to the commission for power to make a specified increase and received permission for half of the increase asked, to continue for six months. After that time it was told it might apply again for such relief as the results would justify. At the end of the six months' test, without applying again for an increase, the company filed a bill to enjoin the commission from continuing to enforce the rates last fixed on the ground they were confiscatory. The Supreme Court held that the company, having a franchise rate, was not entitled to any judicial relief, however inadequate the rate, and that a grant of any relief, even if only partial, was entirely within the power and discretion of the commission. [Henderson Water Co. vs. Corporation Commission of North Carolina et al., 46 Supreme Court Rep., 113.]

ILLINOIS—Care Required to Avoid Injury to Child.

An instruction that if a motorman, by the exercise of ordinary care, could have known that a child was about to cross the track or was in a position of danger, it was his duty to exercise

ordinary care to avoid injury, ordinary care being defined as that degree of care which ordinarily prudent persons under the same or similar circumstances would have exercised is not an erroneous instruction. It does not require the motorman to possess absolute knowledge of what the child proposed to do. [Liska vs. Chicago Railways, 149 Northeast Rep., 469.]

INDIANA—City Authorities Can Prohibit jitney Buses from Operating Over Certain Streets.

Public streets are for the use of the public and for general ordinary use, but their use to carry on private business is a privilege and not a right. Hence their use by jitney buses may be permitted by the city upon such terms as it may prescribe. In this decision, the city of Muncie was held to have power to prohibit the operation of such buses on those parts of the city's streets on which there were located street railway tracks, over which cars were regularly operated. The fact that such an ordinance might be a benefit to the street railway company did not make it unfair or unreasonable, and it was not a grant of special privilege or unjust discrimination. [Denny vs. City of Muncie et al., 149 Northeast. Rep., 639.]

MAINE—Weight to Be Given Expert Medical Opinion.

A trial developed a decided difference of opinion between the expert witnesses on each side as to the injuries which the plaintiff sustained and counsel for the defendant contended that it greatly preponderated in favor of his client and the jury manifestly erred. No claim of bias or prejudice on the part of the jury was made. The court held the testimony of expert witnesses is only an expression of opinion, from which the jury may obtain some assistance, not otherwise available to them, but this testimony is wholly for the consideration of the jury. There is no doubt the plaintiff was seriously injured, so that it is impossible to say that the jury manifestly erred in the award of damages. [Johnson vs. Bangor Ry. & Electric Co., 131 Atlantic Rep., 1.]

MASSACHUSETTS—Duty of Operator of Car in Reservation Limited to that of Refraining from Reckless Conduct.

For a considerable distance on Huntington Avenue, Boston, the electric cars operate in a reservation with a vehicle highway on each side. A person intending to become a passenger was struck by a car while he was walking on this reservation toward a stopping post. The court held that the company owed such a person no duty except to refrain from wanton or reckless conduct. [Treen vs. Boston El. Ry., 149 Northeast. Rep. 625.]

PENNSYLVANIA—Duty of Pedestrian Crossing Track.

Failure of a pedestrian to look out for cars continually when crossing a street on which there are tracks is negligence *per se*. After crossing one track, the pedestrian should look out for cars on the second track of a double track line. [Patton vs. George et al., 131 Atlantic Rep., 245.]

Personal Items

G. K. Jeffries Heads C. E. R. A.

Operating Head of Terre Haute, Indianapolis & Eastern Made President of Central West Body

Guy K. Jeffries was elected president of the Central Electric Railway Association at the annual meeting in Indianapolis, Ind., on Jan. 27. Since 1916 he has been general superintendent of the Terre Haute, Indianapolis & Eastern Traction Company. Before that for several years he was the superintendent of the company. This makes the period of his connection with electrified railways one that covers more than 23 years, all spent in work in the Central West.

For 43 years Mr. Jeffries has been



G. K. Jeffries

engaged in one phase or another of railway work. In 1883, when he was only seventeen years old, Mr. Jeffries entered the service of the Cleveland, Cincinnati, Chicago & St. Louis Railroad, or the so-called "Big Four," as telegraph operator. Three years later he was promoted to the position of train dispatcher. After another period of three years Mr. Jeffries resigned from the "Big Four" to become connected with the Erie Railroad as chief train dispatcher and trainmaster. In that post he remained nine years, widening his experience and turning his attention to phases of railroad work which he had not undertaken before.

Just about this time the building of the interurbans was getting under way. Men with experience similar to that of Mr. Jeffries were difficult to find in electric railway work and many new electric roads turned to the steam railroads for operating talent. This is what the Indianapolis & Northwestern Traction Company did. It drafted Mr. Jeffries as superintendent of the road between Indianapolis and Lafayette. Events seemed again to be working in cycles of three years, for Mr. Jeffries in 1906 resigned from the Indianapolis & Northwestern Traction Company to

become superintendent of the Terre Haute, Indianapolis & Eastern Traction Company's line between Indianapolis and Richmond. Ten years later he was made general superintendent.

Messrs. Sawyer and Eales Off for Australia

W. H. Sawyer, president of the East St. Louis & Suburban Railway, and Herbert W. Eales of the Union Electric Light & Power Company, St. Louis, Mo., left on Jan. 28 for Australia, where they will direct an extensive survey into electrical development for the Victorian government. Both were honored at a farewell dinner at the Missouri Athletic Association, St. Louis, on Jan. 27. The hosts were the officials of St. Louis public utilities and electrical concerns.

The speakers at the dinner were Louis H. Egan, president of the Union Electric Light & Power Company; Col. Albert T. Perkins, manager for the receiver of the United Railways, St. Louis; T. O. Maloney, W. L. Upson, Fred D. Lyon, G. W. Welsh and Edward Sawyer. Waldo O. Lyman, president of the St. Louis Electrical Board of Trade and president of the Wagner Electric Corporation, was toastmaster.

Messrs. Sawyer and Eales were to sail from San Francisco on Feb. 2. The subjects which they expect to cover in their survey were indicated in the account of their appointment in the *ELECTRIC RAILWAY JOURNAL* for Jan. 9, page 90.

H. A. Mullet Advanced to Vice-President

Howard A. Mullett, who left the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., to join the Yellow Cab Company, Chicago, last August, has just been named vice-president of the latter company, which is now a General Motors subsidiary. Mr. Mullett began his career as an apprentice in a Pittsburgh electrical plant, went through every phase of the business and then entered the automotive field. In Milwaukee he rose from motorman to assistant general manager in charge of transportation. At the time of the establishment of the new department his jurisdiction was extended to cover the company's newly created city and interurban motor bus division.

Charles H. Brough, formerly Governor of Arkansas, has been selected director of the Arkansas Public Service Information Bureau. Dr. Brough served as Governor of Arkansas from 1917 to 1921 and his administration was marked for its progressive and constructive legislation. Before his election as Governor he was identified with the educational interests of Arkansas and Mississippi, serving for twelve years as professor of economics and sociology at the University of Arkansas.

M. Ackerman with Lake Shore

Former Official of Cincinnati & Dayton Traction Made General Manager of Cleveland Interurban

M. Ackerman, general manager of the Cincinnati & Dayton Traction Company, has resigned to become general manager of the Lake Shore Electric Railway, with headquarters at Sandusky, effective Feb. 1.

In thus going to the Lake Shore, Mr. Ackerman is returning to take charge of the property on which he obtained his early electric railway experience. There he started at the bottom, serving, first, as a shop man and, later, as a motorman. Added responsibility came with his appointment as train dispatcher. Later he was made trainmaster.

In December, 1907, Mr. Ackerman started service with electricity on the Youngstown & Ohio River Railway, originally a steam line operating between Washingtonville and Salem, Ohio. Another move came in April, 1908,



M. Ackerman

when he was made general manager of the Springfield & Xenia Railway. Here he successfully operated a property which had previously been a losing venture. By the fall of that year the improved condition of the company's finances made it possible to pay a dividend to stockholders.

He continued with this property until January, 1914, when he took charge of the operation of the Interurban & Terminal Company at Cincinnati with the title of general superintendent. Again an unprofitable line was put on a paying basis and by 1916 there was a surplus in earnings. An unfavorable situation kept the margin small. Every effort was made to meet the severe conditions brought about by the war, but operating costs mounted rapidly and the company was finally forced to abandon service.

As a result of the reputation he had established for himself in his handling of these properties, Mr. Ackerman was made general manager of the Cincinnati & Dayton Traction Company in July, 1918. Subsequently outstanding mortgages on the property expired and the owners of the underlying liens refused to renew them. To conserve the property a receiver was appointed in

November, 1920. Mr. Ackerman remained as the active operating head. The difficulties encountered by the entire industry during the past few years did not deter the management. It struggled to bring the property back to a profitable earning basis. This work is bearing fruit. Improved conditions have opened a new outlook for the property, which is about to be reorganized. Announcement has been made of a receiver's sale to be held on March 8 as the first step in connection with this proposed plan.

In returning to the Lake Shore Electric Railway, Mr. Ackerman will be in a position to apply to the affairs of that company experience ripened during the most difficult years of the industry's history, a period in which he assumed responsibilities that constantly grew greater.

J. E. Albert Joins Public Service Railway

J. E. Albert, for the past two years assistant general manager of the Wheeling Traction Company, Wheeling,



J. E. Albert

W. Va., resigned that position on Jan. 1 to become traffic engineer of the Public Service Railway, Newark, N. J. Mr. Albert began his railway career with the West Penn Railways in 1916 while a student at the University of Pittsburgh. At this time he was engaged in valuation work. During the summer of 1917 he again engaged in work for the West Penn.

Upon graduation from the School of Engineering of the University of Pittsburgh he enlisted in the U. S. Army and was connected with the air service. He was later commissioned and rated as an aerial observer. In January, 1919, he returned to civil life and entered a special engineering department of the West Penn Railways, dealing with rates and valuation and the appraisal of electric and other properties prior to absorption by that company. He was also engaged on special reports covering arbitration of wages and similar subjects. He remained in this work for three years.

In January, 1922, he was transferred to the office of Vice-President C. P. Billings as assistant to that official. Two years later he was appointed to the position of assistant general manager at Wheeling.

London Tramways Honor Mr. Fell

A. L. C. Fell, who retired recently as general manager of the London County Council Tramways, London, England, owing to ill health, was entertained recently by his numerous friends at a complimentary dinner in London. The gathering included a large number of tramway managers and engineers as well as representatives of municipalities and many men of note associated with tramway enterprise. Sir John Timpson, chairman of the Portsmouth Corporation Tramways Committee, presided. He said in proposing the health of the guest that the increase of passengers and revenue of the London County Council Tramways during Mr. Fell's managership was enormous, and it spoke well for Mr. Fell that he carried out so efficiently his duties in connection with the development. C. J. Spencer, general manager of the tramways associated with the London underground railways, declared it was due to the foresight of those who designed the London tramcars that today these were among the finest passenger vehicles in existence.

Sir Albert Stanley, Sir Arthur Balfour, Sir John Courtis, James Dalrymple and A. Croxton, all men prominent in the British tramway field, spoke of the great work which Mr. Fell had done for the development of tramway services.

In his acknowledgement Mr. Fell said that for transport there was nothing more effective than a steel wheel running on a steel rail. It would have been a happy day for London if the London County Council could have obtained through running rights for cars in the metropolitan area. So far it had not been possible to enter into an agreement that would include the tramways and the omnibuses, but he hoped before long a fusion of interests would take place, because it was the only way in which the traffic of London could be handled satisfactorily.

E. D. Adams Receives John Fritz Medal

Award of the John Fritz Gold Medal to Edward Dean Adams, New York City, for achievement as "an engineer, financier, scientist, whose vision, courage and industry made possible the birth at Niagara Falls of hydro-electric power," is announced by the Engineering Foundation.

This medal was established in 1902 in honor of John Fritz, pioneer in the American iron and steel industry. It is bestowed annually for notable scientific or industrial achievement and is the highest honor bestowed by the engineering profession in this country.

Most of Mr. Adams' long and intensely active business life was devoted to large enterprises combining engineering and finance. He had a leading part in the organization and reorganization of numerous railroads, including the West Shore, the Central of New Jersey, the Western Maryland and the Northern Pacific.

He created the American Cotton Oil Company out of innumerable small companies, led in establishing the All-America Cables and had an important

share in many other industrial undertakings. He was also in the investment banking business for many years.

R. G. Winans in Operating Post

R. G. Winans has resigned as assistant engineer of the New York State Public Service Commission to accept the position of field supervisor with the Fitkin Utilities, Inc., under the direction of the General Engineering & Management Corporation, New York.

After he was graduated from Pratt Institute of Science and Technology, in the industrial electrical engineering course, Mr. Winans was employed in the testing and switchboard and central-station construction departments of the General Electric Company. He was also employed by the Schenectady Railway, Schenectady, N. Y., in the power and mechanical departments, later being appointed engineer of power and equipment.

Mr. Winans has been assistant engineer with the New York State Public Service Commission for twelve years. During most of that time he has been



R. G. Winans

in charge of electric railway engineering and operation in so far as it has effected public regulation. To him the subject of valuation has furnished no end of interesting work. Determination and regulation of adequate facilities and service has always offered to him the opportunity for constant study because of the ever-changing traffic requirements.

In his new position he will be associated with C. A. Brooks in the supervision of electric railway properties under the management of the Fitkin Utilities, Inc.

Ed Jacobs, formerly secretary and treasurer of the Shreveport Railways, Shreveport, La., was elected vice-president of the company at the recent annual meeting. He succeeds Capt. W. T. Crawford, who died on Aug. 2.

Lewis Goldberg assistant Attorney-General of Massachusetts, has been appointed a commissioner in the Massachusetts Department of Public Utilities, succeeding David A. Ellis, resigned. In 1914, after practising law for a year, he was appointed Assistant United States Attorney in the Boston district and was active in the Palmer régime in the prosecution of "Red" interests in

New England. Mr. Goldberg was born in Russia 38 years ago and was brought to Lawrence, Mass., at the age of three months. He was educated at Harvard College and was graduated from the Harvard Law School in 1913.

W. G. Curren has been appointed general manager of the New York terminals of the Baltimore & Ohio Railroad to succeed R. B. White, now an officer of the Central Railroad of New Jersey. In his new capacity Mr. Curren will be in charge of the lines of the Staten Island Rapid Transit Railway, recently electrified.

Charles A. Brann, superintendent of traffic for the Houston Electric Company, Houston, Tex., has also been made superintendent and passenger agent of the Galveston-Houston Electric Railway. He succeeds George G. Morse, who has gone to Palm Beach, Fla., as general superintendent of the Florida Motor Bus Transportation Company.

Obituary

Charles Payson Treat, the engineer who built the street railway system of Trinidad, Col., died at Palo Alto, Cal., on Jan. 28. Mr. Treat took a very prominent part in the building of the Nicaragua Canal and then built a railroad across the Greytown swamp in Nicaragua. He was 79 years old.

Dr. A. C. Harrison, chief surgeon of the United Railways & Electric Company, Baltimore, Md., died on Jan. 17. Many employees of the company feel his death as a personal loss because of his tireless work in their behalf. He entered the World War service in January, 1918, in time to assemble the personnel for what was to become the highly efficient army base hospital 42. Dr. Harrison was 62 years old.

Arthur R. Bush, manager of the industrial department of the General Electric Company, Schenectady, N. Y., died at his home there on Jan. 24. In 1884 he entered the employ of the Edison Company. In 1892 he was made district engineer of the Edison General Electric Company in the New England district, but resigned this position in 1904 to accept the vice-presidency of the Union Bag & Paper Company. In 1906 he returned to the General Electric Company as manager of the power and mining department. Later he was made manager of the industrial department.

Harry C. Mason, electric street railway engineer for the Texas Company, died in Quincy, Mass., on Jan. 26. For many years Mr. Mason was operating engineer in the public utility field. His experience and reputation were recognized in other pursuits and he turned his attention to the science of lubrication as an outlet for his engineering talents, becoming connected with the Vacuum Oil Company in 1902. After three years he went to the Galena Signal Oil Company and after twelve years entered the service of the Texas Company. Mr. Mason was an active member of the New England Street Railway Club. He was born in Portland, Me., on Nov. 10, 1867.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

A Field with Neglected Possibilities

A Synthesis of Opinion Regarding the American Attitude Toward Foreign Trade

Domestic prosperity abounds in the United States. In the electric railway field, as in practically every other line of industry, manufacturers are engaged in a steady, if not an exciting, rate of production. This has resulted in a certain indifference on their part toward export business, of necessity carried on in a manner different from the trade practices of American industry. The attitude of "take it or leave it" quite fits the characterization which many Americans have adopted in the past, when taking part in the drama of international trade.

Mr. Manufacturer asks himself, "Why should I seek to build up a foreign business, in handling which I must make exorbitant concessions as to credit allowances and perhaps throw my policy of highly standardized production to the four winds, when my domestic market is quite adequate for my sales requirements? If the manufacturers of other countries wish to go to the lengths which are demanded of them by the consumers in South America, the Orient, and elsewhere, they are welcome to the business. I prefer to follow the even tenor of my way, and to be undisturbed by any of these annoying considerations which are constantly cropping up in the export business."

That is the shortsighted view. The domestic market may not forever be a purveyor of golden eggs, and the manufacturer who has not made an honest effort to emulate the early Egyptians and store up fodder sufficient for the lean years may find himself very much out in the cold. It is, perhaps, stressing the obvious to paraphrase Washington and say, "In time of plenty prepare for want," but a foothold in the foreign field, gained at the present time, might open a welcome channel for distribution in the event of a slackening of the domestic market. However, the manufacturer must be prepared to go half way in meeting the foreign consumer.

The operator of a railway in the Argentine, for example, has been accustomed to purchasing equipment under a scheme of long-time payments—sometimes six months, sometimes a year and sometimes even two or more years. He has been given these credits by European manufacturers from time immemorial and has come to accept them as a matter of course. If American manufacturers are not willing to talk business with him on something approximating this basis he will, in most cases, take his trade elsewhere.

Furthermore, the foreign operator cannot be brought overnight to a com-

plete adoption of standardized products. He may want a special type of brake on his car which has been long since thrown into the discard by the manufacturers of brake equipment. But if they flatly refuse to turn out a small order of these brakes for him, on the grounds that they could not be produced efficiently, he will most assuredly go to some one who will take a more sympathetic attitude toward his wants, as he conceives them.

The fact that American capital has been so widely distributed throughout the foreign field of recent years augurs well for a wider acceptance of materials produced in this country, provided the manufacturers follow up this very real advantage in their methods of dealing with the consumer. A prominent South American business man stated not long ago that German and English products were widely used in his country prior to the war, because from those sources capital had been secured for investment in the industries there, and, further, that the European manufacturers had always striven to understand his countrymen.

One of the most difficult problems of the export concern, particularly the one that deals with the countries of South America and the Orient, in which the industrial life is carried on at a rate much less intense than is the case in this country, is to impress the American manufacturer with the truth of these facts. The comment has been made time and again that Americans do not and will not understand. But for those who will make a serious effort to study the requirements of the foreign markets a real harvest is at hand, if these same exporters may be credited with knowing whereof they speak.

Hark to the Words of the Maintenance Man!

A touching lament concerning the disturbing custom of bus manufacturers who change the catalog numbers of bus parts with utter abandon and with the most complete disregard for the nerves of maintenance foremen in the operating companies appeared in the January issue of *Two Bells*, the official publication of the Los Angeles Railway. The appeal for the standardization of bus parts follows:

Catalog numbers of bolts and nuts mean little in the bus manufacturer's life when it comes to a little matter of improving parts, and it follows that these numbers vary with the seasons, owing to the program of improvements in bus equipment. To the troubleman who knows the parts by number, one improvement and another, meaning changes in catalog numbers, force him to gather his repair parts by guess and by gosh, which doesn't always help a stalled bus to get moving. Here is an incident related at the garage to illustrate the state of affairs:

Bus operator, to dispatcher: "This is bus 66. I have trouble with my clutch and can't move! A nut is lost off the lever."
Dispatcher, to garage: "66, clutch trouble, make it snappy."

Garage foreman to trouble man: "Go out to bus 66 and put a nut on the clutch lever."
 Trouble man: "What kind of clutch lever on that model?"

Foreman: "If that bus has a number 79 transmission, it has a 1366 clutch, and let's see, that lever has a double clevis that takes a 5A99 nut, but if that bus has a 92 transmission it will have a 1581 nut."

Trouble man: "Huh!" Goes to store room, "Gimme a bunch of clutch levers and nuts."

Trouble man arrives at bus 66 only to find its transmission has been changed to an 86, which takes a 47½-16 pin!

All joking aside, there is much that the bus manufacturers can do along this line in effective co-operation with the transportation industry.

C. C. Castle Joins the New American Car & Foundry Motors

Charles C. Castle has resigned from the National Railway Appliance Company, New York, the Hegeman-Castle Corporation, Anglo-American Varnish Company and the Genesco Corporation, and on April 1 will be associated with the American Car & Foundry Motors Company.

Important Data Condensed

Mitchell-Rand Manufacturing Company, New York, has prepared a novel wall sheet of the tables most frequently used in both electrical and machine shops. Tables of inch equivalents, copper wire and similar data have been separately printed in many forms for shop reference, but a single chart containing all of the tables in general use is indeed unique.

The United States Bureau of Standards supplied data for the copper wire card and allowable carrying capacities for copper wire. The dimensions of twist drills and machine screws and other shop helps have heretofore been available only after search through technical publications.

P.R.T. Gets 135 Buses

Seventy-five double-deck, semi-enclosed gas-electric buses were ordered a few days ago by the Philadelphia Rapid Transit Company. In addition, 60 single-deck gas-electric 29-passenger buses are to be obtained. The new units will be supplied by the Yellow Truck & Coach Manufacturing Company of Chicago, Ill. It is expected that the buses will cost approximately \$1,750,000. Their purchase is one of the steps which P.R.T. is taking to prepare for the Sesqui-Centennial Exposition crowds.

Metal, Coal and Material Prices

Metals—New York		Feb. 2, 1926
Copper, electrolytic, cents per lb.	14.04	
Copper, wire base, cents per lb.	16.00	
Lead, cents per lb.	9.25	
Zinc, cents per lb.	8.40	
Tin, Straits, cents per lb.	62.00	
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	\$4.85	
Somerset mine run, Boston, net tons	2.20	
Pittsburgh mine run, Pittsburgh, net tons	2.05	
Franklin, Ill., screenings, Chicago, net tons	1.625	
Central, Ill., screenings, Chicago, net tons	1.25	
Kansas screenings, Kansas City, net tons	2.30	
Materials		
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	\$7.00	
Weatherproof wire base, N. Y., cents per lb.	17.75	
Cement, Chicago, net prices, without bags	2.10	
Linseed oil (5-bbl. lots), N. Y., cents per lb.	11.30	
White lead in oil (100-lb. keg), N. Y., cents per lb.	15.50	
Turpentine (bbl. lots), N. Y., per gal.	\$1.03	

No Need for Concern

Fear for Condition of Steel Industry Is Unfounded—Railway Buying Is Active

The post-holiday period in the steel trade is always one of temporary retrenchment, with a considerable decrease in purchasing and in orders received by fabricators and other consumers of steel. Having established a new record for production last year, the market has been content to rest for a time upon its laurels and to indulge in the luxury of a breathing spell. Some prophets of gloom have, of course, been quick to predict the inevitable slump. But the majority of observers are maintaining an optimistic outlook upon things generally, with a healthy inclination to proceed a bit cautiously and to advise against any incipient movements toward inflation.

The mid-January issue of *Iron Age* says:

It has taken the first ten business days of the new year for the steel market to get a fair start and much of its activity in that time has been in specifications rather than new orders. While the heavy finished steel bookings in November brought out some suggestions of a movement toward higher prices, there are no indications today of such an effort as that of last January to stimulate specifications by advancing quotations.

Railway buying has been a considerable feature of the past month's activity, with some heavy orders placed for rails, cars and structural steel. The majority of this has of course occurred in the steam railroad field. A rather interesting comment on the price situation which has existed in the face of record production was made by A. I. Findley, editor of *Iron Age*, in his annual review. He said:

Now that producers know how easily we can have a 44,000,000-ton year, which ought to give a fair business and fair profits for all, cannot some of them cease selling as though they were in a 30,000,000-ton year and cease trying to operate as though it were a 50,000,000-ton year?

Improvements Made in White Chassis

To meet the changing conditions of passenger transportation the White Company has made a number of improvements and refinements in its special bus chassis, which hereafter will be known as the White bus chassis Model 50-B, supplanting Model 50-A.

One of the more important changes is the installation of Westinghouse air brakes as standard equipment. This type of brake on rear axle makes it possible to use metal to metal friction surfaces, considered the most effective way of dissipating the heat which accompanies severe braking and regarded as the best way to insure effective brake control under all conditions and long life for brake linings.

Various mechanical refinements have been made in the motor, improving flexibility and smoothness of operation. Among other changes, the manifold has been fitted with a hot air stove. The oil system has been revised and improved by increasing the oil pump capacity and by the installation of an effective oil strainer. A large area of fine mesh wire screen removes all dirt

particles, providing a clean oil supply at all times.

Other refinements made in the chassis include an improved rear axle with double bearings of taper roller type at wheel ends of spindles, designed to meet the most severe conditions of operation; a stronger frame, 10 in., with gusseted cross members; an improved radiator, consisting of heavy cast aluminum shell with removable core; a faster third speed, with other transmission improvements; a heavier housing and tube in the steering gear, making easier steering, and larger tires, 34 by 7 pneumatics, with duals in rear.

The White Model 50-B bus chassis is built with the optional wheelbases of 198 in. or 230 in. to accommodate bodies seating from 25 to 29 passengers.

Record Order for Fare Boxes Placed with Johnson

What was said to be the largest single order for fare boxes to be used in one-man bus operation ever placed in this country was that recently accorded to the Johnson Fare Box Company, Chicago, Ill. This concern was chosen to supply the apparatus necessary to collect fares on the 333 gas-electric buses recently ordered by the Public Service Railway, Newark, N. J.

The boxes to be manufactured for this order will be of the 12-volt, automatic type, the electric current for their operation being supplied from the storage batteries of the buses. They are the same general type as the boxes in use on the street cars of the Public Service Railway, except that the voltage feature has been modified to suit bus operation.

Messrs. Woodin and Curwen Head New Brill Company

W. H. Woodin, head of the American Car & Foundry Company and the American Locomotive Company, has been elected chairman of the board of directors of the Brill Corporation. The other directors include Samuel M. Curwen, Francis A. Lewis, W. Clarke Mason, E. P. Rawle, W. M. Hager, C. S. Sale and G. R. Scanland. The executive committee consists of W. M. Hager, chairman; S. M. Curwen and W. H. Woodin.

The directors elected the following officers of the new corporation which was organized recently to acquire the J. G. Brill Company, the Hall-Scott Motors Corporation and the Fageol Motors Company:

President—Samuel M. Curwen.
 Vice-President—G. R. Scanland.
 Secretary—H. C. Wick.
 Treasurer—S. A. Mallette.

Rolling Stock

Sunbury & Selinsgrove Railway, Selinsgrove, Pa., has ordered three double-truck closed motor cars, equipped with Brill 77 E-1 trucks, from the J. G. Brill Company, Philadelphia, Pa.

Arkansas Central Power Company, Little Rock, Ark., has ordered 30 single-end safety cars, equipped with Brill

79 E-1 trucks, from the American Car Company, St. Louis, Mo.

Medelline Municipal Railways, Colombia, has ordered from Brill four single-truck safety cars for first-class service and two single-truck safeties for second-class service.

Bogota Municipal Tramways, Brazil, has ordered one complete single-end safety car equipped with Brill 79 E-1 trucks from the J. G. Brill Company, Philadelphia, Pa. In addition, seven car sets, complete except for woodwork, have been ordered from the same source for erection in Brazil. These are of the single-end, double-door type, equipped with Brill trucks.

New York, Westchester & Boston Railway, New York, N. Y., is contemplating the purchase of ten or twenty additional standard passenger motor cars for service on the various lines of the company.

Georgia Railway & Power Company, Atlanta, Ga., at the end of 1925 received 40 one-man safety cars for use on the city line in Atlanta. The company ordered in January of this year ten new one-man cars. Five of these are for the Stone Mountain line and five for the Atlanta to Marietta line. Details of the city cars are as follows:

Bullder of car body	Cincinnati Car Company
Type of car. Double-end, double-truck safety	
Seating capacity	48
Weights:	
Car body	17,444 lb.
Trucks	10,860 lb.
Equipment	9,076 lb.
Total	37,380 lb.
Bolster centers, length.....	20 ft. 6 in.
Length over all.....	46 ft. 4 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 4 in.
Height, rail to trolley base.....	11 ft. 8 in.
Body	All steel
Interior trim.....	Light mahogany
Headlining	Agasote
Roof	Low monitor
Air brakes	Safety Car Devices
Armature bearings.....	Sleeve
Axles	Brill, Cambria hammered steel
Bumpers	Pressed steel
Car signal system	Faraday
Car trimmings	Bronze oxidized, Dayton
Center and side bearings.....	Brill
Compressors.....	Westinghouse Traction Brake DH-16
Control.....	General Electric K35-JJ and line breaker
Curtain fixtures.....	Rex roller; Curtain Supply No. 90, pinch fixture
Curtain material.....	Pantasote, grain Morocco, color No. 86
Destination signs	Keystone LIT
Door-operating mechanism.....	National Pneumatic Door Engines
Energy-saving devices.....	Economy Meter
Penders	H-B wheel guards
Finish	Enamel
Gears and pinions.....	One-half GE A-1, one-half Tool Steel
Hand brakes	Peacock staffless
Heater equipment.....	Consolidated Car Heating No. 321 and thermostats
Headlights.....	one-half Crouse-Hinds, one-half Golden Glow
Journal boxes	Brill
Lightning arrester.....	General Electric aluminum cell
Motors	Four GE-265-A, inside hung
Registers	Ohmer
Sanders	Ohio Brass, form 2
Sash fixtures.....	Dayton, wedge type
Seats	Hale & Kilburn, AWO-400
Seating material.....	Springless canvas-lined cane
Slack adjusters.....	American automatic
Springs	Brill
Step treads.....	Aluminum, Cincinnati Car Company
Trolley catchers.....	Ohio Brass No. 13141
Trolley base	Ohio Brass, form 4
Trolley wheels	Nuttall 6 in.
Trucks	Brill 77-E-1
Ventilators	Monitor sash
Wheels	26 in. chilled
Special devices.....	Treadle door, rear exit signal lights, brakes and power interlocked with treadle door.

Track and Line

Hot Springs Street Railway, Hot Springs, Ark., is expending nearly \$100,000 in paving its right-of-way and improving its roadbed and service generally.

Capital Traction Company, Washington, D. C., undertook approximately ten rebuilding and replacement jobs in 1925. One of the most important was the rebuilding of tracks from 29th Street to 35th Street in Georgetown. Rebuilding and paving from 29th Street to 32d Street, cost \$70,000. From 32d Street to 35th Street there were general repairs to the tracks and a new paving at a cost \$17,500. On Eighth Street Southeast, another complete track rebuilding job cost \$77,500. A new crossover on You Street at Portner Place, cost \$17,150. A switch at Rock Creek Loop, which had to be completely rebuilt, cost \$8,520. The east crossing at Pennsylvania Avenue and Fourteenth Street was rebuilt at a cost of \$14,100, of which the company paid \$7,050. A crossing over the Baltimore & Ohio Railroad tracks at Chevy Chase Lake, cost \$1,680. New ties, ballast and joints for the track on Kennedy Street, cost \$6,040. Work on Connecticut Avenue in connection with the removal of the center poles, and other work, cost \$49,600. The total for all the work was \$255,040.

Power Houses, Shops and Buildings

Interstate Public Service Company, Indianapolis, Ind., suffered a loss of approximately \$40,000 on Jan. 20 when a new building, an addition to the machine shops at Scottsburg, Ind., was destroyed by fire. The building was equipped with much valuable machinery, most of it new. The loss is covered by insurance.

Boston Elevated Railway, Boston, Mass., is considering the erection of a garage on Washington Street, Somerville. A. J. Blackburn, the company's engineer, is preparing plans.

Chicago & Joliet Electric Railway, Joliet, Ill., has announced plans to erect a garage, with a capacity for 25 buses, at St. Louis and Osgood Streets, Joliet, Ill. Work will start as soon as weather permits.

Trade Notes

Fred M. Egolf is now representing the Timken-Detroit Axle Company in the Eastern territory. He was formerly with the Haskelite Manufacturing Company and joined the Timken organization as a railway representative the first of the year. After a period of instruction at the Detroit plant of the company he was transferred to New York, where he will make his headquarters at 2 Rector Street.

G. R. Scott has become connected with the Electric Service Supplies Company, Chicago. Mr. Scott has been connected with the Electrical Engineer-

ing Company, St. Paul Electric Company, Fort Wayne Electric Works, General Electric Company and recently has been district manager of sales in Chicago for the Jeffery-DeWitt Insulator Company. Mr. Scott will cover the states of Minnesota, North and South Dakota, Iowa and eastern Nebraska.

Walter Jackson, Mount Vernon, N. Y., has reprinted in pamphlet form the paper "What Can Railway Men Do Toward Relief of Traffic Congestion," presented by him before the meeting of the New England Street Railway Club at the Copley-Plaza Hotel, Boston, Mass., on Oct. 29, 1925.

Earle Gear & Machine Company, Philadelphia, Pa., has announced the sale and transfer of all designs, patterns, patents and good will covering Earle centrifugal pumps to the Aldrich Pump Company, Allentown, Pa. The transfer will in no way conflict with the Earle company's regular business of manufacturing Earle truck gears, cold metal saws and special machinery.

Atlas Safety Brake Company, Inc., Buffalo, N. Y., manufacturer of hand brakes and safety brakes, has been chartered at Albany with \$200,000 capital. Edward C. and Louise M. Norton, 37 North Division Street, Buffalo, and Charles J. Kuhn, 90 Main Street, Tonawanda, N. Y., are the directors and subscribers. Hubert E. Collins, 622 Prudential Building, Buffalo, is attorney for the corporation.

New Advertising Literature

International Harvester Company of America, Chicago, Ill., has issued a 95-page bulletin illustrating the various types of McCormick-Deering industrial tractors and operating equipment which are available for road work and other types of industrial service.

Crouse-Hinds Company, Syracuse, N. Y., has issued a folder setting forth the various applications of its safety hand lamps. These are constructed to withstand the severe service encountered in railway shops, garages, industrial plants, storehouses, and similar places. A number of types are provided so that varying service requirements may be met with a maximum of efficiency. The lamps are listed and described in Bulletin No. 2071.

Armco Culvert & Flume Manufacturers' Association, Middletown, Ohio, has issued Bulletin R-23, entitled "Reducing the Cost of Culvert Replacement." It deals with the problem of placing culverts under existing embankments which are in active use for transportation purposes and indicates that the "jacking" method is the most effective manner of carrying on this type of work. Ten advantages of this method are given. They are: (1) Roadbed is undisturbed. (2) No work is done on track level. (3) No false work required. (4) No traffic interruption. (5) "Slow orders" not required. (6) Safety of train operation unimpaired. (7) Cuts construction period to one-half or one-third. (8) No special equipment or skilled labor required. (9) No settlement of track after construction. (10) Installation costs reduced to less than one-half.

PEACOCK



Always "there in a pinch"

Modern air brakes are as nearly perfect as human ingenuity can make them. But there are possible conditions under which they become ineffective, as every railway man knows. Suppose such a condition occurs on a grade, or in other dangerous circumstances. Will your hand-brakes meet the situation?

With Peacock Staffless Brakes the motorman spins the hand wheel and the car quickly comes to a stop.

A serious accident has been averted—and the installation of Peacock Staffless Brakes is justified. For these brakes are dependable—always "there in a pinch."

Because there is no limit to the length of chain that can be wound in with the Peacock Staffless Brake, neither slack chain nor worn shoes nor extensive piston travel can prevent effective braking.

The tremendous braking power obtainable, the minimum platform space required, the simplicity of operation and the low charges for maintenance are additional reasons why Peacock Brakes are standard equipment on most of the prominent electric railway systems throughout the country.

Ask for complete particulars and for estimates on your installation.

National Brake Company, Inc.

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GODWIN Steel Paving Guards

Proven by service to economically prevent seepage and disintegration of street railway paving.

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Light—strong—durable—inexpensive
For Electric Cars and
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**Type 300-A
Car Seat**

A thoroughly practical car seat combining maximum durability for hard city service, with all the inherent space-saving and comfort producing features of Hale-Kilburn design.



**Type 199-F
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For suburban and light-weight inter-urban cars where an inexpensive but well designed comfortable seat is needed. Push upholstered spring edge cushion and detachable back.



Our latest catalogues give full details of many attractive designs for both cars and buses. Write for copies.



**Type 208
De Luxe
Bus Seat**

One of the many Hale-Kilburn seats especially designed for bus service. This 208 De Luxe Type has divided back, spring cushions and air cushion pads. Leather or imitation upholstery as specified.



**Type 392-EE
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Finest type of inter-urban car seat with extra high three-part head-roll and mahogany capped armrest. Metal parts of pressed steel for light-weight. Push upholstery or other materials as specified.

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PANTASOTE and AGASOTE

Remember these trade-marked names when you order
—in the end it always pays!

There are very specific reasons why Pantasote and Agasote have been practically "standard practice" on nearly every railroad in the country for the past 25 years and more.

Pantasote, unlike most "artificial leathers," contains neither rubber compounds nor Pyroxylin. Hence it will not deteriorate on exposure to weather, or dry out and crack in a dry atmosphere. Furthermore, it is non-inflammable, and cannot be ruined by the dropping of a cigarette end or lighted match.

Pantasote colors are permanent, even under the most scorching sun.

Pantasote equals in grain and texture the best grades of leather; is infinitely more durable than "splits"; and will not stretch out of shape.

Pantasote is always soft and pliable; easy to work with, and easy to keep clean.

Agasote for car roofing, headlining and interior trim is an absolutely homogeneous fibre board combining, in the most efficient way, the good qualities of wood and steel paneling with none of their drawbacks.

Agasote cannot warp, crack or deteriorate in service. It actually improves with age. Being free from any rosins or glue compounds it will never mark surface coatings. It is permanently waterproof even without the protection of paint.

Pantasote and Agasote in service all over the country consistently demonstrate exceptional wearing qualities and consequent economy.

Make them a standing specification for new cars and buses, and for rehabilitation. Insist upon getting just what you specify—in the end it always pays.



TEXACO ELECTRIC RAILWAY COMPRESSOR OIL

Being applied to a compressor on a car of the New York Railways Corporation, 146th St. and Lenox Avenue, New York City.



TEXACO



The Chosen Lubricant
of ELECTRIC RAILWAYS





Cars built for Georgia Ry. & Pr. Co., Atlanta

New modern cars will build business have built business *are building business*

The prediction was freely made by street-railway men, not long ago, that new modern cars would attract more patronage and reduce operating and maintenance expense. This prediction is proved true by numerous railways which have replaced obsolete equipment with cars embodying the latest developments. Cummings Car and Coach Company stands ready to assist you in your program of modernization.

Cummings Car and Coach Co.

Successors to McGuire-Cummings Mfg. Co.

111 W. Monroe Street
Chicago, Illinois

Lightweight City and Interurban
Cars

Snow-Fighting Equipment

Motor-Coach Bodies

Gas-Electric

Motor Coaches



"OURS AVERAGE 20,000 MILES"



Goodyear-equipped bus of The Jefferson Highway Transportation Company, Minneapolis, Minn.

"We have been in the bus operation business going on eight years," writes Mr. Edgar F. Zelle, President of the Jefferson Highway Transportation Company, Minneapolis, Minn., "and now operate 25 buses, serving 35 municipalities.

"Since we started operating we have used every type of tire, and have now concentrated entirely on Goodyear Tires, due to the excellent service they have rendered and the low cost per mile.

"The tires average 20,000 miles, and we have one instance where a tire has traveled 63,000 miles.

"These are remarkable mileage figures, inasmuch as the buses travel every day throughout the year and over all sorts of roads."

* * *

Goodyear Bus Tires make records for long, economical, trouble-free mileage wherever they are used. The Goodyear Bus Tire line offers you the particular tire that is suited to your operating conditions.

For every Goodyear Cord Bus Tire there is an equally fine Goodyear Tube, built especially to the needs of bus service

GOODYEAR

Copyright 1926, by The Goodyear Tire & Rubber Co., Inc.



Lang Bodies *invite passengers* ~

THE above scene is duplicated at hundreds of starting points all over the country.

A luxurious Lang Body drawn up to the curb. The open door. Passengers, with baggage securely distributed and properly protected from the elements, seated comfortably inside, and others entering. Soon the hum of the motor and presently the graceful lines of the Lang Body will pick its way through the busy streets and out along the winding ribbon of open road.

Between cities, over mountains, crossing bridges and through desert stretches, Lang Bodies are daily setting new standards for comfortable transportation. Developed to the point of utmost luxury, they combine grace of line with a sturdiness of construction that *keeps* them on the road.

LANG
BODIES
Miles of Smiles
for Rider for Driver for Owner

DESIGNERS AND BUILDERS OF INDIVIDUALIZED BODIES
FOR THE BUS MANUFACTURING INDUSTRY.

THE LANG BODY COMPANY • CLEVELAND ~ Q



Collier Service

A nation-wide
organization
building and
sustaining car
card advertising
space values



Barron G. Collier, Inc.

Candler Bldg.
New York

Gibraltar Bodies

Trademark registered in United States

applied for in foreign countries



GIBRALTAR Bus Bodies are now standard on such leading chassis as Reo, Studebaker, Safeway Six-Wheeler and International Harvester.

Many of these have been in continuous daily operation over city and inter-city routes for upwards of one hundred thousand miles.

Operators specify Gibraltar Bodies on repeat orders.

The Auto Body Company leads in manufacture of standardized bus bodies in quantities.

THE AUTO BODY COMPANY

LANSING, MICHIGAN



Designers and Manufacturers of Motor Coach and Bus Bodies Open and Enclosed Automobile Bodies

"NATIONAL-SHELBY"

SEAMLESS COLD DRAWN STEEL TROLLEY POLES

The Durable Trolley Pole of High Efficiency

"NATIONAL-SHELBY" SEAMLESS STEEL TROLLEY POLES are cold drawn from a selected grade of basic Open Hearth Steel low in phosphorus and sulphur. Prior to the last cold drawing operation, the material is given a special heat-treatment which leaves the grain of the steel in the finest condition. The elastic limit of these poles averages from 60,000 to 70,000 pounds per square inch.

The inserting of the reinforcement is done by the most approved and effective method and, as now made, the reinforcement is integral with the body of the pole, which adds materially to its efficiency.

Details regarding structure and tests are given in a booklet entitled—"The 'SHELBY' Seamless, Cold Drawn Steel Trolley Pole". Ask for your copy today.



NATIONAL TUBE COMPANY, PITTSBURGH, PA.

GENERAL SALES OFFICES: FRICK BUILDING

DISTRICT SALES OFFICES

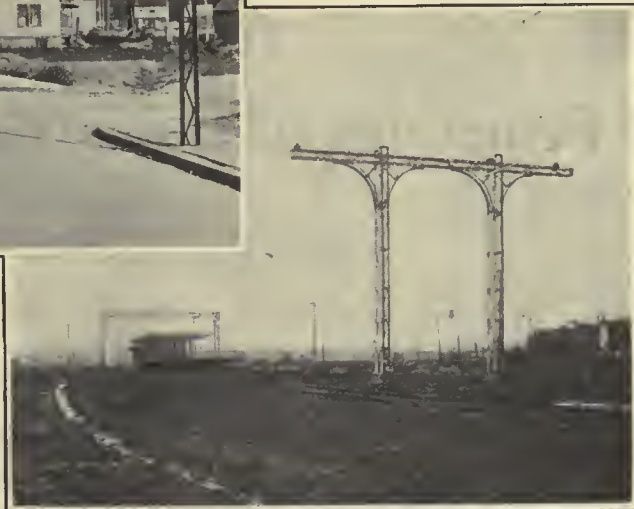
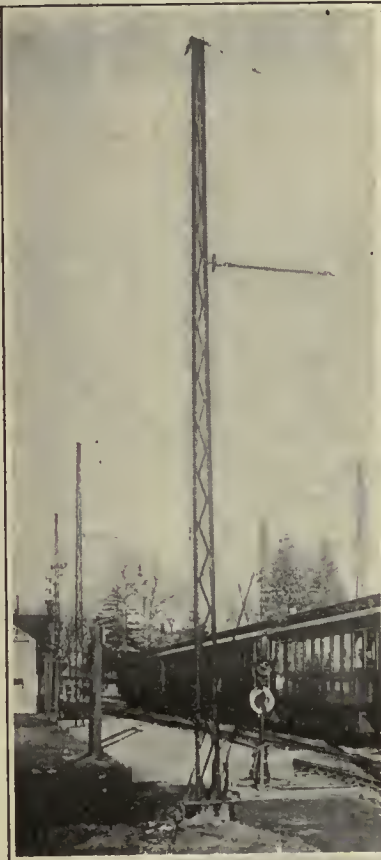
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Every Form of Supporting Structure from one source—*BATES*

KEEPING step with the developments of the electric railway industry, and its need for a wide variety of supporting structures, Bates Products have developed from the original Bates Pole to meet every need. In our

own plants, we are manufacturing Bates one-piece expanded steel poles, fabricating towers and other more elaborate structures, and when required, galvanizing these products. Bates Fabricated Structures often combine Bates Expanded Steel sections, thus reducing the number of riveted joints and making for greater lightness and strength.

Whatever your requirements, you will find it advantageous to secure an estimate from Bates.



AN ORGANIZATION specializing on the supporting structure requirements of the electrical industries, having complete facilities for designing, detailing, fabricating and painting or galvanizing its products, all within one company.

Specify Bates
POLES
TOWERS
SUBSTATIONS

BATES Expanded Steel Truss Co.

General Offices and Plants
EAST CHICAGO, INDIANA, U. S. A.

New York Office: 51 E. Forty-second St., New York City

Sales Mount Despite



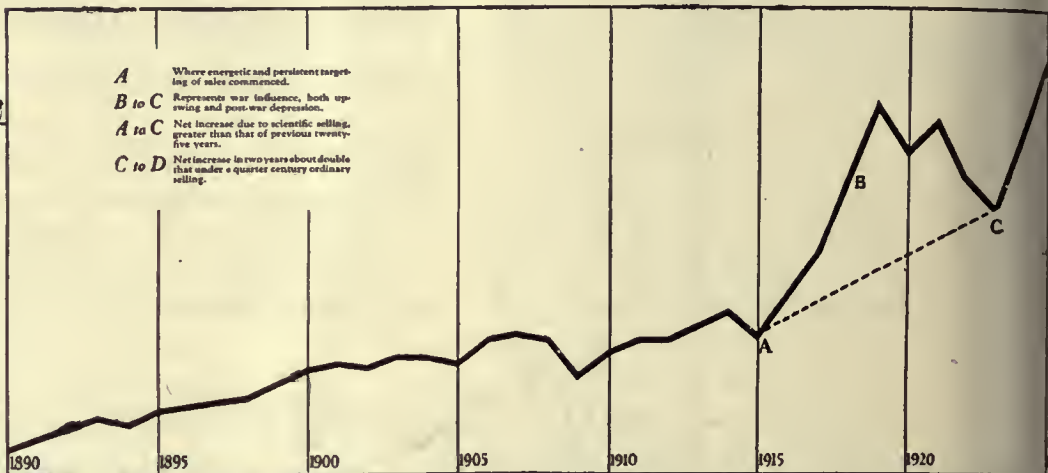
What the Weston Electrical Instrument Corporation did, as expressed in terms of the McGraw-Hill
FOUR PRINCIPLES OF INDUSTRIAL MARKETING

1. **Market Determination:** Each Market was analyzed and its sales possibilities were accurately appraised. The application of Weston instruments in solving the problems of each industry was also carefully worked out. This provided the salesman with definite information on which to base their selling and eliminated misdirected effort.

2. **Buying Habits:** Since Weston salesmen were selling service first and instruments only as an incident to the service it became important to contact with the men who came closest to the problems involved. This idea was behind the careful study of buying habits.

3. **Channels of Approach:** The Weston Sales promotion program to get its story to the proper persons was nicely balanced to include the intensive use of publications which cover worth-while buying groups: manufacturers' literature and special missionary work through salesmen. These were supplemented by certain worth-while exhibits.

4. **Appeals that Influence:** The Weston advertisements and literature were changed from descriptions of instruments and made a source of helpful information. Industry found in them solutions of their problems and suggestions for more efficient and economical operation. Salesmen keyed their selling to the same basis of helpfulness. This type of appeal was very helpful in winning recognition for Weston representatives.



*Eloquent Testimony
 for McGraw-Hill*

Four Principles of Industrial Marketing

AT SOME time in its career most every business faces a situation that is perplexing. The course is not always charted—the way not always clear.

The Weston Electrical Instrument Corporation faced perplexing situations not only once, but often. Tied up as they were with the electrical industry, their problem continually was to keep abreast of its ever-shifting development.

More than once the company saw markets which consumed as much as 40% of its volume gradually disappear. Fortunately the foresight of Weston engineers anticipated develop-

ments. The needed new types of instruments were ready.

But would Weston continue to keep sales mounting under shifting markets and the highly competitive conditions ahead?

What would be the position of the company when important patents expired?

These were the questions which faced the Weston corporation at various times.

The company answered them by deciding on a policy of intensive study and cultivation of markets. Not only were present markets an-

Shifting Markets

alyzed and appraised, but trends were studied and many types and forms of new instruments were developed to meet the future markets. Complete detailed studies of the production problems of each market were placed in the hands of the Weston field organization. Salesmen were equipped to know where business was to be obtained and how to perform a service to the customer in getting it.

This plan squares perfectly with the McGraw-Hill Four Principles of Industrial Marketing, and the results prove their effectiveness.

The net result of ten years' operation under this plan shows in the chart. A gain in eight years greater than that of the previous twenty-five is an achievement, while a gain in the past two years of about twice the gain of a quarter century is tremendous testimony to scientific selling.

Every manufacturer who sells to industry cannot fail to recognize the soundness of these McGraw-Hill Four Principles of Industrial Marketing. The important thing is to apply them to one's own selling. To help accomplish this the McGraw-Hill Company offers its fifty years' accumulated experience with industry. The same wide knowledge of industry which makes the McGraw-Hill publications the authority in their fields is available to individual manufacturers and their advertising agents in working out their sales programs.

Each McGraw-Hill office is able to extend this service to manufacturers in its territory. Its staff of Marketing Counselors will be available at any time for conference on this most important matter. Such counsel is freely offered in the interest of efficient selling to industry.

The McGraw-Hill Publications

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ENGINEERING & MINING JOURNAL-PRESS
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POWER

CONSTRUCTION & CIVIL ENGINEERING
ENGINEERING NEWS-RECORD

TRANSPORTATION
ELECTRIC RAILWAY JOURNAL
BUS TRANSPORTATION

RADIO
RADIO RETAILING

OVERSEAS
INGENIERIA INTERNACIONAL
AMERICAN MACHINIST
(European Edition)

DIRECTORIES & CATALOGS
CENTRAL STATION DIRECTORY COAL CATALOG
ELECTRIC RAILWAY DIRECTORY
EMF ELECTRICAL YEAR BOOK
RADIO TRADE DIRECTORY
COAL FIELD DIRECTORY

KEYSTONE CATALOG
(Coal Edition) KEYSTONE CATALOG
(Metal-Quarry Edition)

ANALYSIS OF NON-METALLIC MINING, QUARRYING
AND CEMENT INDUSTRIES

[This advertisement is the eighth of the series which is appearing in the *New York Times*, *Philadelphia Public Ledger*, *Wall Street Journal*, *Cleveland Plain Dealer*, *Chicago Journal of Commerce* and *New York Herald-Tribune*; in *Printers' Ink*, *Advertising and Selling Fortnightly*, *Class*,

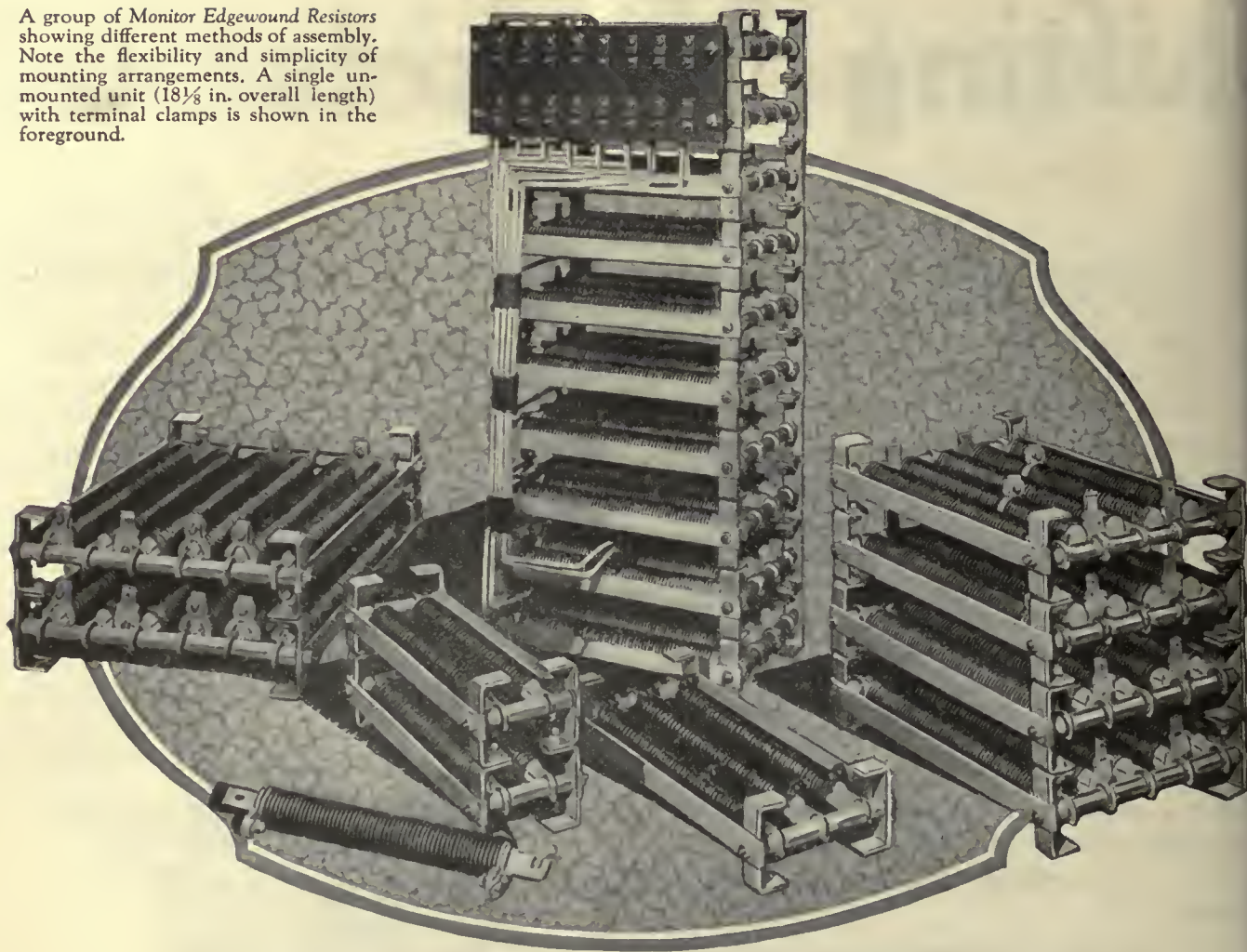
Sales Management, and in the McGraw-Hill Publications. The purpose of these advertisements is to arouse a national appreciation of the need for improving industrial sales efficiency, and to awaken a keener interest in the correct principles of industrial selling.]

McGraw-Hill Company, Inc., New York, Chicago, Philadelphia, Cleveland, St. Louis, San Francisco, London, Publishers of

McGraw-Hill Publications

REACHING A SUBSTANTIAL MAJORITY OF THE BUYERS IN THE INDUSTRIES THEY SERVE

A group of Monitor Edgewound Resistors showing different methods of assembly. Note the flexibility and simplicity of mounting arrangements. A single unmounted unit (18½ in. overall length) with terminal clamps is shown in the foreground.



Fits any space—carries any current

A YEAR ago the Monitor Edgewound Resistor was offered as the solution of the heavy-current electrical-resistor problem. Extensive use by the U. S. Government and in numerous widely diversified industries typify the quick and favorable acceptance which it received.

Among the features leading to such quick adoption of Edgewound Resistor are the following:

Resistive Conductor—Tough, strong, non-corrosive and amply supported. Ohmic

resistance practically the same at all operating temperatures.

Flexibility—Units may be arranged in various ways and taps taken off at any point.

Simplicity—Relatively few units for given capacity; method of connection simple and positive.

Compactness—Possible because of excellent heat dissipation.

Dependability—Practically non-breakable; no localized heating with resultant burn-outs.

Ask for Bulletin 1077 which describes the Edgewound Resistor in detail.

MonitorControllerCompany

500 E. Lombard St., Baltimore, Maryland

New York
Chicago
Buffalo

Cincinnati
Detroit
Pittsburgh

The Original
**"Just Press a Button"
System**

Cleveland
Boston
Philadelphia

St. Louis
Birmingham
New Orleans
Washington



From the First

THE average man—even the average trained operating engineer—does not realize the harm that may be done to machinery by even the occasional use of a poor lubricant. When a piece of machinery is run for a short time with a lubricant which does not provide an unbroken film of oil between the bearing surfaces, these surfaces become slightly roughened. However slight this roughness may be, it tends to break the protective film of lubricant, even when the correct grades of oil or grease are used.

The only way to make sure of getting full power and service from any piece of machinery is to prevent this first slight abrasion of the bearing surfaces by using the right grades of lubricants from the time the machine is put into operation. Whenever you install a new machine, get the advice of a competent lubricating engineer as to the grades of oils and greases to use, and provide a supply of these lubricants before permitting the machine to be used.

Standard Oils and Greases

are made in grades which cover the lubrication requirements of all machines in use in the industrial world. The lubricating engineers of the Standard Oil Company (Indiana) will be glad to make a survey of your plant and recommend the grades that are suited to your machinery.

No charge is made for this service. To make arrangements for such a survey, phone or write our nearest branch.

STANDARD OIL COMPANY

(Indiana)

General Offices: 910 S. Michigan Avenue

Chicago, Illinois



STUD TERMINAL RAIL BONDS



View of main line New York, New Haven and Hartford Railroad. Insert is our type CPOF Bond a concealed type of bond which is used on all main line tracks.

Performance is the best means by which the efficiency of a rail bond can be determined.

The use of Stud Terminal Rail Bonds, exclusively by the New York, New Haven and Hartford Railroad clearly indicates that this type of bond has stood the test of time.

No bond has more convincingly demonstrated its efficiency and ease of maintenance on lines carrying heavy traffic.

The catenary messengers shown in the illustration are Extra High Strength Galvanized Steel, furnished by the American Steel and Wire Company.

AMERICAN STEEL & WIRE COMPANY

Sales Offices:

CHICAGO.....208 So. La Salle Street
NEW YORK.....30 Church Street
CLEVELAND.....Rockefeller Building
WORCESTER.....94 Grove Street
BOSTON.....185 Franklin Street
PHILADELPHIA.....Widener Building
PITTSBURGH.....Frick Building

BUFFALO.....670 Ellicott Street
DETROIT.....Foot of First Street
ATLANTA.....Trust Company of Georgia Building
CINCINNATI.....Union Trust Building
BALTIMORE.....32 So. Charles Street
WILKES-BARRE, PA.....Miners Bank Building
ST. LOUIS, Liberty Central Trust Company Building
KANSAS CITY.....417 Grand Avenue

ST. PAUL-MINNEAPOLIS, Pioneer Bldg., St. Paul
OKLAHOMA CITY.....First National Bank Building
BIRMINGHAM, ALA.....Brown-Mark Building
MEMPHIS, TENN.....Union and Planters Bank Bldg.
DENVER.....1st National Bank Building
DALLAS.....Praetorian Building
SALT LAKE CITY.....Walker Bank Building

Export Representatives: U. S. Steel Products Co., New York Pacific Coast Representative: U. S. Steel Products Company, San Francisco Los Angeles Portland Seattle



“ONE WEAR” MEANS “ONE COST”

When first cost is final cost repair burdens disappear.

Maintenance calls for shops, for tools, for men.
Maintenance is a necessity for some steel wheels.

But

DAVIS “ONE WEAR” STEEL WHEELS

never need re-turning. They
are worth more than other
wheels because their first
cost is their final cost.

AMERICAN STEEL FOUNDRIES

NEW YORK

CHICAGO

ST. LOUIS

DAVIS WHEELS ARE SAFER WHEELS

The Measure of Your Message

THE measure of your message is the number of actual readers reached by the publications carrying your advertising.

You may buy "10,000 circulation," but is it delivered, or is it merely a "claim" of the publisher?

The A. B. C. offers a service that will enable the advertiser and advertising agent to measure every message placed in the leading publications of the United States and Canada.

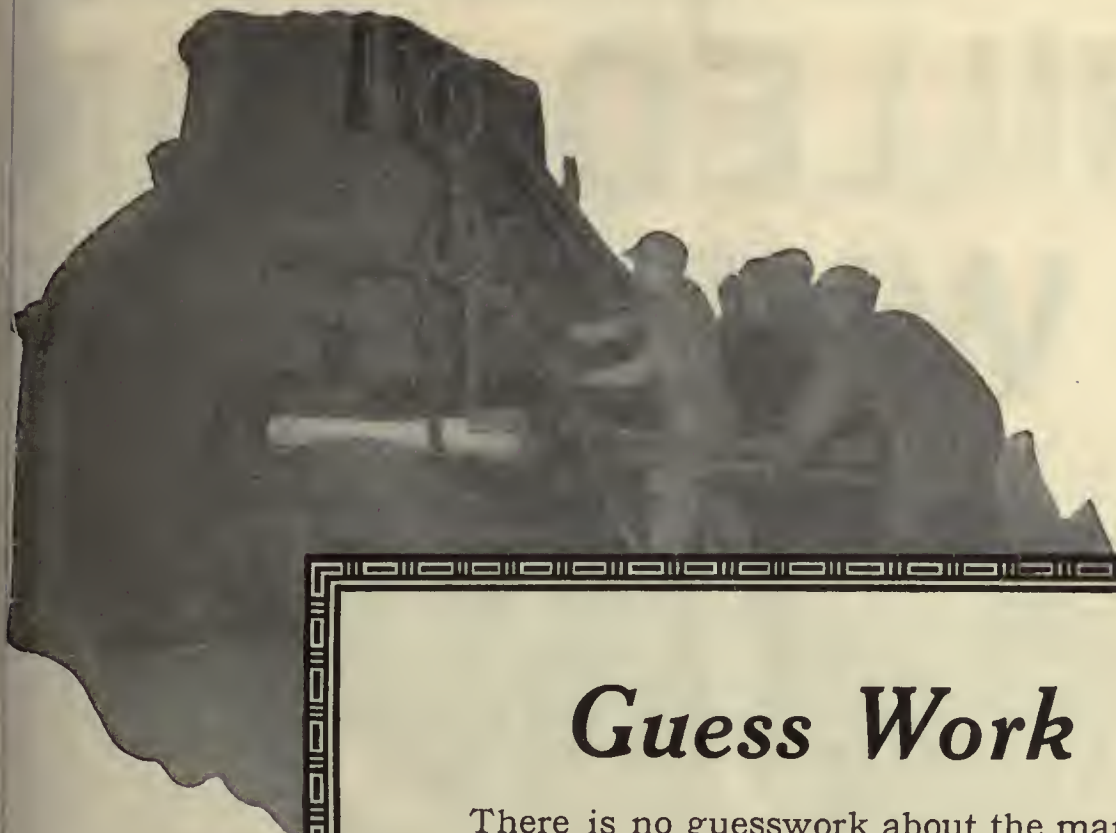
Every day in all parts of the Continent A. B. C. auditors are checking the records of publishers, and their findings are tabulated in the form of A. B. C. reports.

These reports, by the authentic, reliable, verified data they contain, enable the advertiser to measure exactly how widely his message has been distributed.

*Ask for the latest A. B. C. Report
on the ELECTRIC RAILWAY JOURNAL.
It is a member of the A. B. C.*

ELECTRIC RAILWAY JOURNAL

36TH STREET AT 10TH AVENUE
NEW YORK, N. Y.



Guess Work

There is no guesswork about the manufacture of Carnegie Axles. More than sixty years of experience in their making, coupled with every facility for correct heat treatment and accurate testing, insure the meeting of the specification in the finished product.

Nor is the purchase of Carnegie Axles guesswork. Rather it represents an assurance of satisfactory service.

Prompt Deliveries
of
Car and Tender Axles
Engine Truck and Driving Axles
Electric Motor and Street Car Axles
Miscellaneous Forgings

CARNEGIE STEEL COMPANY

General Offices • Carnegie Building • 434 Fifth Avenue

PITTSBURGH



PENNSYLVANIA

CHILLED IRON WHEELS



There is a wheel for every service

Highest co-efficient of Brake Shoe Friction with Minimum Loss of Brake Shoe Metal.

The hard tread becomes polished in service, reducing to a minimum wear between wheel and rail.

The soft hub insures easy machining and perfect axle fit.

**ASSOCIATION OF MANUFACTURERS
OF CHILLED CAR WHEELS**

1847 McCormick Building
CHICAGO

50 PLANTS ~ DAILY CAPACITIES 20000 WHEELS

Annual Maintenance Number

A Banner Issue in a Banner Year

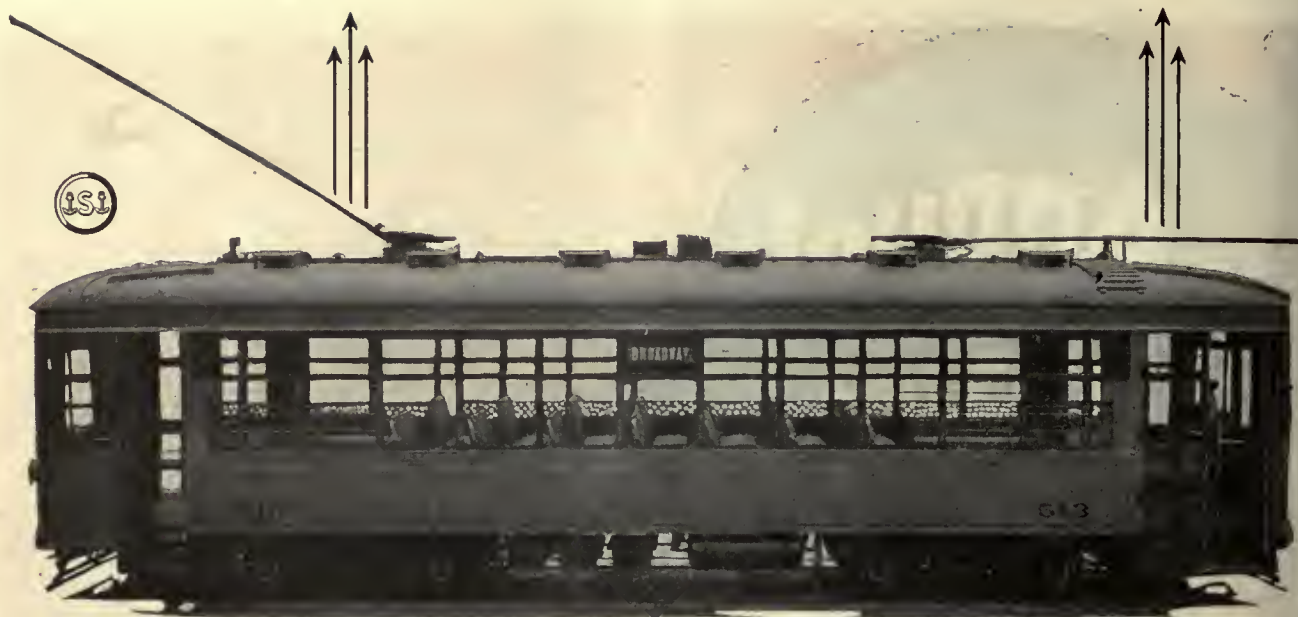
More riders through better maintenance
is the keynote of the

**Annual Maintenance Number
Dated March 20,**

of Electric Railway Journal. Maintenance
experts will tell how to merchandise trans-
portation through improved rolling stock
and noise reduction; better maintenance of
track, trolley and sub-station and by the
use of modern methods in shop and garage
repair work.

Plan to capitalize your opportunity through
strong and effective advertising space in
this banner issue.

Electric Railway Journal



FIFTEEN new cars — recently ordered by the Indiana Service Corporation — are equipped with “STANDARD” Rolled Steel Wheels, Quenched and Tempered Carbon Steel Axles, and “Standard” Coil and Elliptic Springs.



Rolled Steel Wheels
Quenched and Tempered
Carbon Steel Axles
Coil and Elliptic Springs

STANDARD STEEL

WORKS COMPANY
PHILADELPHIA, PA.

BRANCH OFFICES:

CHICAGO
ST. LOUIS
NEW YORK
HOUSTON, TEXAS

PORTLAND, ORE.
RICHMOND, VA.
SAN FRANCISCO
BOSTON

ST. PAUL, MINN.
PITTSBURGH, PA.
LOS ANGELES, CAL.
MEXICO CITY, MEX.

WORKS: BURNHAM, PA.



Let Thermit help unload this burden!

When you ask the City Council, or the Legislature, for relief from paving costs and maintenance, you want to be pretty sure of your ground, don't you? You want to demonstrate to them, if possible, that your cars do not damage the pavement.

Think how often holes in the paving occur at the rail joints, while along the rail the balance of the surface may be perfect.

You can greatly reduce the effect that rails may have on pavement by eliminating the joints. Rail joints in paved track are unnecessary, and they afford too much room for argument about paving damages.

Thermit welding eliminates the joints, and with them the principal source of paving damage. It costs no more than other methods of joining rails and does a solid, permanent job. No joint is left to get loose or pound. This preserves the paving surface and prevents water from getting under it to cause damage.

*Thermit Welds are
the best track insurance.*



METAL & THERMIT CORPORATION
120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH

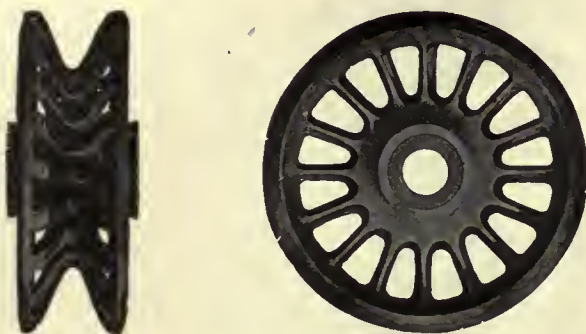
CHICAGO

BOSTON

SOUTH SAN FRANCISCO

TORONTO

SLEET CUTTING DEVICES



Nuttall Sleet Wheels replace the standard trolley wheels and efficiently clean sleet coated wires.



Nuttall Sleet Scrapers hook over the trolley wheel—can be attached instantly, and clean the wire thoroughly. Don't wait for a sleet storm—order today.

R.D. NUTTALL COMPANY
PITTSBURGH  PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

TRIBLOC CHAIN HOIST



Good tools for better work

Making the worker's job more agreeable shows a favorable result on production cost sheets.

Get this result in your shop by transferring the costly drudgery of load lifting to sturdy Tribloc Chain Hoists. Proper load lifting devices keep your mechanics at the job they're paid to do.

We will gladly tell you how Triblocs can be used to advantage in your shop—making more profitable the efforts of hard-to-get mechanics.

Send for Catalog 7-B

FORD CHAIN BLOCK COMPANY
2nd and Diamond Sts., Philadelphia, Pa.

2303-D



Complete satisfaction

Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

No-wear Check Pawl
Free-Winding Tension Spring
Ratchet Wind
Emergency Release
Perfect Automatic Lubrication

Earll Catchers and Retrievers

C. I. EARLL, York, Pa.

Canadian Agents:

Railway & Power Engineering Corp., Ltd., Toronto, Ont.

In All Other Foreign Countries:

International General Electric Co., Schenectady, N. Y.

The "RING" of a COIN!

Just as a coin—Johnson Electric Type Fare Boxes ring true—and this is true, literally as well as figuratively. Each coin dropped in the slot rings the bell with a pleasing note of finality that indicates the transaction is closed.

Johnson Fare Boxes are protecting, saving and earning money for transportation companies in every state in the union, making their operations more profitable.

They are preventing mistakes, carelessness and other forms of human weakness. They are reducing expenses, improving services, and paying for themselves by the savings effected.

Just as a coin rings true in a Johnson Fare Box, so do Johnson Fare Boxes ring true in their unflinching every day service to the transportation companies.



JOHNSON FARE BOX CO.

CHICAGO, ILL.
4619 Ravenswood Ave.

NEW-YORK, N.Y.
980 Eighth Avenue



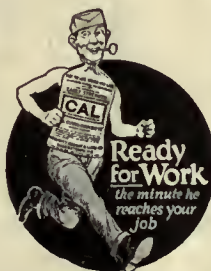
Wisconsin Avenue Circle, Washington, D. C., where concrete was laid by the District of Columbia and, with the aid of Cal, was opened to traffic in six days.

THE city of Washington requires a curing time of 18 days for concrete streets, and this would have been the case with Wisconsin Avenue Circle—but for Cal.

The Washington Street Railways Company has used Cal in all track construction concreting for the past four years. On their recommendation, the city used it in this case with complete satisfaction—opening the street to *full traffic* in six days—one-third the former time.

Cal is the standard accelerator. Use it with your favorite brand of Portland Cement. It is a *powder*, packed in bags like cement, and is ready for work the minute it reaches the job.

How they clipped 12 days from concrete street curing time in Washington



**A Little More Cost—
A Lot Better Job**
Five pounds of Cal to each bag of cement
Less carlots - 2 3/4¢ lb.
Less than ton lots 3¢ lb.
Carlot prices on request
All prices f. o. b. factory,
Berkeley, W. Va.
Cement dealers charge these prices plus freight and handling costs



Uppur Street, Washington, D. C., showing Washington Railway & Electric Company's line where, with the use of Cal, concrete was laid while cars were in constant operation.

NORTH AMERICAN CEMENT CORPORATION

Successor to
Security Cement and Lime Company
HAGERSTOWN, MD.

WASHINGTON

BALTIMORE

ALBANY

PERFECT MICANITE INSULATOR

Reg. U. S. Pat. Off.

ELECTRICAL INSULATION

Micanite armature and commutator insulation, commutator segments and rings, plate, tubes, etc., Empire oiled insulating materials; Linotape; Kablak; Mico; and other products—for the electrical insulating requirements of the railway.

Catalogs will gladly be furnished

MICA INSULATOR COMPANY

Sole Manufacturers of Micanite

Established 1893

68 Church St., New York

542 So. Dearborn St., Chicago

Works: Schenectady, N. Y.

8-F

T. S. Q.

says

"I save repair costs."

Tool Steel Quality

The Tool Steel
Gear and Pinion Co.
CINCINNATI, O.

You're having brush trouble
CORRECT IT

USE LE CARBONE CARBON BRUSHES

They talk for themselves

COST MORE PER BRUSH
COST LESS PER CAR MILE

W. J. Jeandron

Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.

Pittsburgh Office: 634 Wabash Bldg.

Chicago Office: 1657 Monadnock Block

San Francisco Office: 525 Market Street

Canadian Distributors: Lyman Tube & Supply Co., Ltd.,
Montreal and Toronto



Don't Overlook Opportunities

Men who regularly keep in touch with the market through other channels often overlook the many opportunities that are to be found in the

SEARCHLIGHT SECTION

For Every Business Want

"Think SEARCHLIGHT First"

015A

AMERICAN BRIDGE COMPANY

EMPIRE BUILDING—71 BROADWAY NEW YORK, N. Y.

Manufacturers of Steel Structures of all classes
particularly **BRIDGES AND BUILDINGS**

ALSO STEEL BARGES FOR HARBORS AND RIVERS, STEEL TOWERS
FOR ELECTRIC TRANSMISSION, HEROULT ELECTRIC FURNACES, ETC.

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Philadelphia, Pa.
Boston, Mass.
Baltimore, Md.

PITTSBURGH, PA.
Cincinnati, Ohio
Cleveland, Ohio
Detroit, Mich.

CHICAGO, ILL.
St. Louis, Mo.
Denver, Colo.
Salt Lake City, Utah

Duluth, Minn.
Minneapolis, Minn.

Pacific Coast Representative:
U. S. Steel Products Co.,
Pacific Coast Dept.
San Francisco, Cal.
Los Angeles, Cal.
Portland, Ore.
Seattle, Wash.

Export Representative: United States Steel Products Co., 30 Church Street, New York.

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints;
Splice Bars; Hard Center Frogs; Hard Center
Mates; Rolled Alloy Steel Crossings; Abbott and
Center Rib Base Plates; Rolled Steel Wheels and
Forged Axles; Tie Rods; Bolts; Tie Plates and
Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

WHARTON

TRACKWORK

Switches, Mates, Frogs
Complete layouts of all kinds
Made by the originators of
Manganese Trackwork

Wm. Wharton Jr. & Co., Inc.
Easton, Pa.

The DIFFERENTIAL CAR



Standard on
60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY

Johnstown, Pa.

Sales Offices:

Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh
Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle

Export Representative:
United States Steel Products Company, New York, N. Y.



**DON'T
REMOVE
WORN
WHEELS**

This shoe does the work while your
car is in service.

**SAVES TIME—SAVES LABOR—
SAVES MONEY**

WHEEL TRUING BRAKE SHOE CO.
Detroit, Mich.

EST
LUDLUM
1854

Tool Steel HURON

THE SUPER ENDURING TOOL STEEL
FOR BLANKING SILICON TRANSFORMER
SHEETS AND ARMATURE DISCS

LUDLUM STEEL CO.
WATERVLIET
N. Y. - U. S. A.

WE HAVE A
SPECIAL TOOL STEEL FOR
EVERY SPECIFIC PURPOSE.

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of
Water Tube Boilers
of continuing reliability

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PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building



WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters
since 1898 and of Chain Grate
Stokers since 1893

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NEW ORLEANS, 521-5 Baronne Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

THE WORLD'S STANDARD "IRVINGTON"

Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irrington Varnish & Insulator Co.
Irvington, N. J.

Sales Representatives in the Principal Cities

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley
Wheels and Harps has been
demonstrated by large and small
electric railway systems for a
period of thirty years. Being
exclusive manufacturers, with
no other lines to maintain, it is
through the high quality of our
product that we merit the large
patronage we now enjoy. With
the assurance that you pay no
premium for quality we will
appreciate your inquiries.



THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

ELRECO TUBULAR POLES



COMBINE

Lowest Cost Lightest Weight
Least Maintenance Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO

New York City, 30 Church Street

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W. C. PETERS, Manager Sales and Engineering

National Railway Appliance Co.

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Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Bell Locked Fare Box and Change
Maker
The Aluminum Field Coils
Walter Tractor Snow Plows
Cutler-Hammer Electric Heaters
Genesco Paint Oils
Garland Ventilators
Flaxlinum Insulation
Yellow Coach Mfg. Co.'s Single
and Double Deck Busses.
B. G. Spark Plugs

Economy Electric Devices Co.'s
Power Saving and Inspection
Meters
Anglo-American Varnish Co.,
Varnishes, Enamels, etc.
National Hand Holds
Ft. Pitt Spring & Mfg. Co.,
Springs
Anderson Slack Adjusters
Feasible Drop Brake Staffs
Dunham Hopper Door Devices



We make a specialty of
**ELECTRIC RAILWAY
LUBRICATION**

We solicit a test of TULC
on your equipment

The Universal Lubricating Co.

Cleveland, Ohio

Chicago Representatives: Jameson-Ross Company,
Straus Bldg.

Hubbard
and COMPANY

PITTSBURGH • OAKLAND, CAL • CHICAGO



*{ The Hardware makes the line
Hubbard makes the Hardware }*

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.
Positions Vacant and all other classifications, 6 cents a word, minimum charge \$2.00.
Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers, in care of any of our offices count 10 words additional in undisplayed ads.
Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

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1 to 3 inches.....\$4.50 an inch
4 to 7 inches..... 4.30 an inch
8 to 14 inches..... 4.10 an inch
Rates for larger spaces, or yearly rates, on request.
An advertising tick is measured vertically on one column, 3 columns—30 inches—to a page.

"SEARCHLIGHT" IS Opportunity Advertising

—to help you get
what you want.

—to help you sell
what you no
longer need.

Take Advantage Of It

For Every Business Want

"Think SEARCHLIGHT First"

G-36

POSITIONS VACANT

WANTED young engineer, 25-35 years old, experienced street railway equipment installation, research and operation, preferably from manufacturer's end, for similar work by prominent bus manufacturer. Give age, family circumstances, education, and details of employment and experience in order by date, also references and inexpensive photograph. P-881, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

POSITIONS WANTED

ENGINEER, 24 years' experience in electric railway rolling stock maintenance and transportation supervision, open for position. PW-879, Electric Railway Journal, Tenth Ave. at 36th St., New York.

BOOKS AND PERIODICALS

For Sale

25 years' unbound copies Electric Railway Journal, \$50. B&P-880, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

4 High Grade, High Speed, 46 PASSENGER CARS with COMBINATION (Smoking and Baggage) SECTIONS

Exceptionally good for Interurban Service
Every car in first-class operating condition. Built by Cincinnati Car Company. Length over all, 47 ft. 8 in. Height over trolley board, 12 ft. 6 1/2 in. Height over all, 13 ft. 1 1/2 in. Number of seats, 15 across, 4 long. Type of motors, four G.E.-204. Make of trucks, Standard. Wheel base, 6 ft. 6 in. Controller K-34-D. Toilet, 29 in x 34 in. Air Compressor, WH-D-2. These cars good for one or two man operation. See our advertisement in the Jan. 30th issue of this publication for illustration of these cars. Write for further particulars.

We also have some 56-passenger cars of this type, as offered in our advertisement of January 2nd.

J. W. GERKE, Railway Equipment
303 Fifth Ave., New York City

FOR SALE

30 Birney Safety Cars

Brill Built

West, 508 or G. E. 264 Motors. Cars Complete—Low Price—Fine Condition.

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

"SEARCHLIGHT" is the "OPPORTUNITY"
advertising of this industry.

0095

ROOT



Life Guards
Snow Scrapers

Remove Snow as it falls—with Root Scrapers.
Root Spring Scraper Co.
Kalamazoo, Mich.



STUCKI SIDE BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.



CHILLINGWORTH

One-Piece Gear Cases
Seamless—Rivetless—Light Weight
Best for Service—Durability and Economy. Write Us.

Chillingworth Mfg. Co.
Jersey City, N. J.

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we all differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we built. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

100 New Users in the Last Nine Months
KASS SAFETY TREADS
HIGH
in efficiency and lasting qualities
LOW
in weight, initial and upkeep costs
Morton Manufacturing Co., Chicago

"Axle Specialists Since 1866"
Address all Mail to Post Office Box 515, Richmond, Va.

CAR AXLES
J. R. JOHNSON AND CO., INC.
FORGED STEEL AXLES

For Locomotives, Passenger, Freight and Electric Cars
Smooth Forged or Rough Turned—Carbon or Alloy Steel—Plain or Heat Treated, Forged and Turned Piston Rods, Crank Pins, Large Shafts, Round Bars, etc.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry
with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.
Air Beceivers & Aftercoolers
Ingersoll-Rand Co.
Air Springs
Cleveland Pneumatic Co.
Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.
Armature Shop Tools
Elec. Service Supplies Co.
Automatic Return Switch
Stand
Ramapo Ajax Corp.
Automatic Safety Switch
Stand
Ramapo Ajax Corp.
Automobile Trucks
General Motors Truck Co.
Axles
Johnson & Co., J. R.
Standard Steel Works
Axles, Carbon Vanadium
Johnson & Co., J. R.
Axles, Car Wheel
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Johnson & Co., J. R.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.
Axles, Rear
Clark Equipment Co.
Axles, Steel
Carnegie Steel Co.
Johnson & Co., J. R.
Ludlum Steel Co.
Badges and Buttons
Elec. Service Supplies Co.
Barges, Steel
American Bridge Co.
Batteries, Dry
National Carbon Co.
Nichols-Lintner Co.
Bearings and Bearing Metals
General Electric Co.
Westinghouse Elec. & M. Co.
Bearings, Center and Roller
Slide
Stucki Co., A.
Bearings, Roller
Hyatt Roller Bearing Co.
Belts and Gongs
Brill Co., The J. G.
Consolidated Car Heating
Co.
Elec. Service Supplies Co.
Benders, Rail
Railway Track-work Co.
Bodies, Bus
Long Body Co.
Body Material, Haskellite &
Flymet
Haskellite Mfg. Corp.
Boilers
Babcock & Wilcox Co., The
Boiler Tubes
National Tube Co.
Bond Testers
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Boards, Rail
Amer. Steel & Wire Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse Elec. & M. Co.
Book Publishers
McGraw-Hill Book Co.
Brackets and Cross Arms
(See also Pairs, Ties, Posts
etc.)
American Bridge Co.
Bates Expanded Steel Truss
Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.
Brake Adjusters
Nat'l Ry. Appliance Co.
Westinghouse Tr. Br. Co.
Brake Shoes
Remis Car Truck Co.
Brill Co., The J. G.
Wheel Truing Brake Shoe
Co.
Brakes, Brake Systems and
Brake Parts
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Westinghouse Tr. Br. Co.
Bridges, Steel
American Bridge Co.
Brooms, Wire & Rattan
Farson Co.
Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Westinghouse Elec. & M. Co.
Brushes, Wire, Pneumatic
Ingersoll-Rand Co.

Brush Holders
Anderson Mfg. Co., A. &
J. M.
Bulkheads
Haskellite Mfg. Corp.
Bunkers, Coal
American Bridge Co.
Buses, Motor
Auto Body Co.
Brill Co., The J. G.
Mack Trucks
Bushings, Case Hardened and
Manganese
Brill Co., The J. G.
St. Louis Car Co.
Cables
(See Wires and Cables)
Cambrie Tapes, Yellow &
Black Varnish
Irvington Varnish & Ins. Co.
Cambrie Yellow & Black
Varnish
Mica Insulator Co.
Carbon Brushes
(See Brushes, Carbon)
Car Lighting Apparatus
Elec. Service Supplies Co.
Car Mfrs. Ass'n
Railway Car Mfrs. Ass'n
Car Panel Safety Switches
Consolidated Car Heating
Co.
Westinghouse Elec. & M. Co.
Car Wheels, Rolled Steel
Bethlehem Steel Co.
Cars, Dump
Differential Steel Car Co.,
Inc.
Cars, Passenger, Freight
Express, etc.
American Car Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co.
Cars, Second Hand
Electric Equipment Co.
Cars, Self-Propelled
General Electric Co.
Cash Fare Receipts
Rand McNally Co.
Castings, Gray Iron and Steel
American Bridge Co.
Amer. Steel Foundries
Horne & Ebling
Standard Steel Works
Wm. Wharton, Jr. & Co.
Catchers and Retrievers,
Trolley
Earl, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.
Catenary Construction
Archbold-Brady Co.
Ceiling Car
Haskellite Mfg. Corp.
Pantaoite Co.
Cement Accelerator
North American Cement
Corp.
Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.
Circuit Breakers
General Electric Co.
Westinghouse Elec. & M. Co.
Clamps and Connectors for
Wires and Cables
Anderson Mfg. Co., A. M. &
J. M.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Westinghouse Elec. & M. Co.
Cleaners and Scrapers, Track
(See also Snow-Flows,
Sweepers and Brooms)
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
Ohio Brass Co.
Road Spring Scraper Co.
Clusters and Sockets
General Electric Co.
Coal and Ash Handling
(See Conveying and Hoist-
ing Machinery)
Cells, Armature and Field
Economy Electric Devices
Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Cott Handling and Winding
Machines
Electric Service Sup. Co.
Westinghouse Elec. & M. Co.
Cots, Check and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Coin-Counting Machines
Cleveland Fare Box Co.
Johnson Fare Box Co.
Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.
Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Commutator Truing Devices
General Electric Co.
Commutators or Parts
Cameron Elec'l Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Compressors, Air
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Tr. Br. Co.
Compressors, Air Portable
Ingersoll Rand Co.
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General Electric Co.
Ingersoll-Rand Co.
Westinghouse Elec. & M. Co.
Condenser Papers
Irvington Varnish & Ins. Co.
Conduits, Underground
Std. Underground Cable Co.
Connectors, Solderless
Westinghouse Elec. & M. Co.
Connectors, Trailer Car
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Control Systems
Monitor Controller Co.
Controller Regulators
Electric Service Supplies Co.
Monitor Controller Co.
Controllers, Automatic,
Electric
Monitor Controller Co.
Controllers, Electric
Monitor Controller Co.
Controllers, Motor
Monitor Controller Co.
Controllers or Parts
General Electric Co.
Westinghouse Elec. & M. Co.
Controllers, Rheostatic
Monitor Controller Co.
Controllers, Speed
Monitor Controller Co.
Control Systems
General Electric Co.
Westinghouse Elec. & M. Co.
Converters, Rotary
General Electric Co.
Westinghouse Elec. & M. Co.
Conveying & Hoisting
Machinery
American Bridge Co.
Copper Wire
American Steel & Wire Co.
Anacanda Copper Mining Co.
Cord, Bell, Trolley, Register,
etc.
Brill Co., The J. G.
Electric Service Supplies Co.
Roebblings Sons Co., John A.
Samsom Cordage Works
Cord Connectors and Couplers
Electric Service Supplies Co.
Samsom Cordage Works
Wood Co., Chas. N.
Coppers, Car
American Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.
Crane Controller, Electric
Monitor Controller Co.
Cross Arms (See Brackets)
Crossings
Ramapo Ajax Corp.
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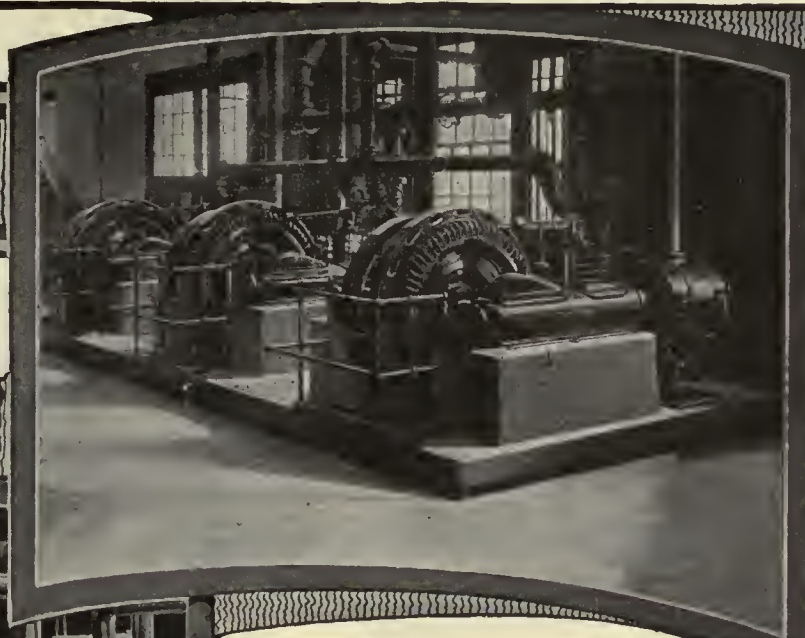
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Made of extra quality stock firmly braided and smoothly finished.
Carefully inspected and guaranteed free from flaws.
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Rods, Wire Cable Products

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Northern CEDAR POLES Western
We guarantee
all grades of poles; also any butt-treating specifications
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WELDING CABLE
ELECTRICAL WIRES and CABLES
John A. Roebling's Sons Company, Trenton, N. J.



WHETHER you sell your transportation via motorbus or electric railway car, the Ohmer Fare Register offers the most perfect protection for the passenger, the conductor and the company.

We also manufacture the Ohmer Fare Box, the Ohmer Hub-Odometer, the Ohmer Receipt Printing Taximeter, the Atco Taximeter, the Ohmer Truck Auditor, and the Ohmer Dashodometer.

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AUTOMATIC BLOCK SIGNALS

for single track and stub end protection
United States Electric Signal Co.
Louisville, Kentucky

THE BEST TRUSS PLANK ELECTRIC HEATER EVER PRODUCED



GOLD CAR HEATING & LIGHTING CO., BROOKLYN, N. Y.

No.
478E

AUTOMATIC SIGNALS
Highway Crossing Bells
Headway Recorders
Flasher Relays

NACHOD SIGNAL COMPANY, INC.
LOUISVILLE, KENTUCKY.



Instantaneous Registration by the Passenger **ROOKE** of fare collection- **SYSTEM**

Meets every condition for all types of cars and buses. The stand device, as shown, adapts it to one-man uses—making register portable or stationary, at option. Handles nickels, dimes, quarters, or metal tickets, in any combination, **FLEXIBILITY** with **CERTAINTY**.



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Coin Counting and Sorting Machines **FARE BOXES**

Lever-Operated and Slip Change Carriers

The Cleveland Fare Box Co.

Cleveland, Ohio
Canadian Cleveland Fare Box Co., Ltd., Preston, Ont.



Gets Every Fare
PEREY TURNSTILES
or **PASSIMETERS**

Use them in your Prepayment Areas and Street Cars

Perey Manufacturing Co., Inc.
101 Park Avenue, New York City



Car Heating and Ventilation

are two of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

The Peter Smith Heater Company
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Automatic Signals
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SEVEN WORKS RAMAPO-AJAX-ELIOT HILLBURN, NEW YORK NIAGARA FALLS, N.Y. CHICAGO, ILLINOIS EAST ST. LOUIS, ILL. PUEBLO, COLORADO SPRINGFIELD, MASSACHUSETTS NIAGARA FALLS, ONT. CANADA	Ramapo Ajax Corporation RAMAPO AUTOMATIC RETURN SWITCH STANDS FOR PASSING SIDINGS TEE RAIL SPECIAL WORK MANGANESE CONSTRUCTION SALES OFFICES AT ALL WORKS Main Office, HILLBURN, N.Y.
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RAILWAY UTILITY COMPANY
CAR COMFORT WITH **HEATERS**
UTILITY **REGULATORS**
VENTILATORS

141-151 West 22d St.
Chicago, Ill.

Write for
Catalogue

1328 Broadway
New York, N. Y.

Dependable Power  for Every Purpose



25 Years of Red Seal Transportation

If there is a definite measure of a manufacturer's qualification for complete mastery in his field it is length and breath of experience.

By this measure Continental Motors stands out clear-cut in its leadership, with twenty-five years of Red Seal Transportation to its credit and a manufacturing experience covering more than 600 different designs, including Red Seal Engines for

many of America's best known buses.

Embraced in Continental's knowledge of bus engines is a complete understanding of the whole subject of bus transportation.

With such practical knowledge of the fundamentals of bus operation Continental is able to design and build bus power plants that work to the advantage of the user from a dollar and cents standpoint.

CONTINENTAL MOTORS CORPORATION

Offices: Detroit, Mich., U. S. A. Factories: Detroit and Muskegon
The Largest Exclusive Motor Manufacturer in the World

Continental Motors

Are Your Cars "Magnetic?"



*Schenectady Railways Place Brill
Modern Type Cars in Service*

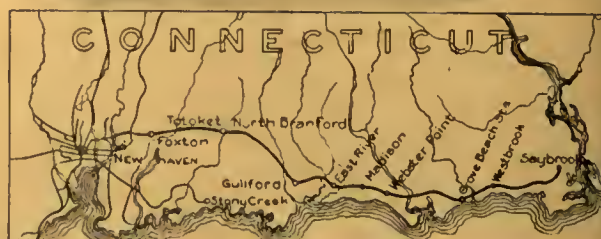
MODERN CARS Attract Passengers

That's why "it pays to modernize." Public patronage must be sought. There's no place in a 1926 transportation system for obsolete or unattractive cars, but there is a place for MODERN CARS. The public prefers attractive street cars; it knows they are safe, quick loading, and can be depended upon in all seasons. Increased revenue and economical operation make an investment in MODERN CARS worth while.

 **THE J. G. BRILL COMPANY** 
PHILADELPHIA, PA.
AMERICAN CAR CO. — G.C. KUHLMAN CAR CO. — WASON MAN'G CO.
ST. LOUIS, MO. — CLEVELAND, OHIO. — SPRINGFIELD, MASS.



The modern car has demonstrated its increased earning power, even to bringing a shut-down property back to life. It is the railways' greatest asset.



Modern rolling stock, one-man operated, turned loss into profit for the New Haven & Shore Line

Operating costs per car-mile, 1924:

Maintenance of way and structures	2.27 cts.
Maintenance of equipment.....	2.04 cts.
Power (delivered to cars).....	4.89 cts.
Conducting transportation.....	5.24 cts.
General and miscellaneous	5.51 cts.
Total.....	19.95 cts.



The resources and the service of the entire G-E organization are available to consider the problems of modernization and co-ordination—to find the most effective means of transportation and recommend and build appropriate equipment to meet each particular requirement in any community.

Modern equipment used:

Motors (4-25 h.p.)	GE-264A
Control (double-end)	G-E type K-35
Air brakes	G-E with safety car control
Compressors	G-E type CP-27B

GENERAL ELECTRIC

ELECTRIC RAILWAY JOURNAL

HOUSTON PUBLIC LIBRARY
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HOUSTON, TEX.

"With RAIL FILLER, maintenance costs will be decreased"

"Two years ago, in a paper read before the Wisconsin Utilities Association in Milwaukee," says Alf A. Oldfield, a leading street railway engineer, "I made the statement that it seemed likely that we would have to avoid the use of concrete in city track zones. But since that time we have made great strides in the development of resilient track, and consequently my idea does not hold.

"About the time that we changed from flexible types of pavement to concrete, we also began the use of ties of steel construction.

"Finally the welded joint and mechanical tie were developed. We used a mechanical tie having asphaltic filler which provides the necessary resiliency. While this was a great advancement, we found it desirable to keep the rail from having direct contact with the concrete between ties. And for this purpose we have adopted Carey Elastite Rail Filler. Our decision was reached after a six months' test on two stretches of track, one with and one without rail filler.

"Personally, I am convinced that concrete pavement in city track zones with rail filler will be found much more satisfactory, and that maintenance costs will be considerably decreased."



Alf A. Oldfield, Engineer of Maintenance of Way, Wisconsin Power & Light Co., Fond du Lac, Wis. Mr. Oldfield is numbered among the best known railway engineers in the country.

* * * * *

Carey Elastite Rail Filler is a mastic compound of asphalt and fiber. It comes in ready-formed slabs shaped to fit any type of rail. A tap with a mallet puts the strip into place. It forms a resilient cushion for the rail, which absorbs traffic impact and reduces noise. Unaffected by moisture or changes in temperature. The very small amount it adds to construction costs is insignificant compared with the saving in maintenance costs which results. Write for full details.

THE PHILIP CAREY COMPANY, Lockland, CINCINNATI, OHIO

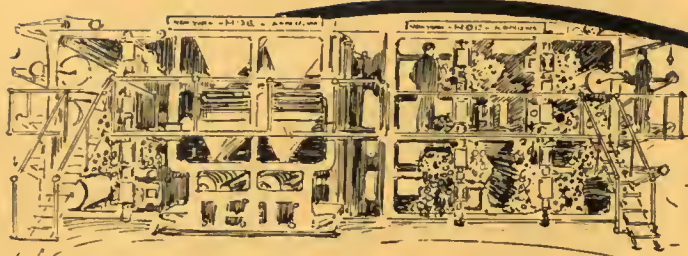


A view of the track system of the Wisconsin Power & Light Co. at Sheboygan, Wis. This shows the type of track construction together with the use of Carey Elastite Rail Filler which was being set in place when the photograph was taken.

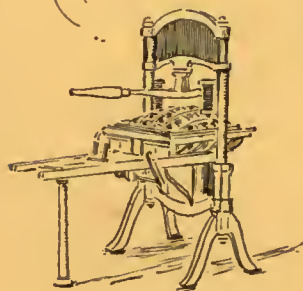
Carey Elastite
REG. U.S. PAT. OFF.
TRADE MARK REG. U.S. PATENT OFFICE



SYSTEM OF
TRACK INSULATION



Economic Retirement of Obsolete Cars



The printing industry owes its present position to its consistent acceptance of every proven advancement in the art of printing, even when such action necessitated the extensive scrapping of obsolete equipment.

And, as in the printing industry,—
engineering studies on a number of electric railway properties, conducted during the year 1925, show conclusively that—
it pays handsomely to retire obsolete equipment.

One of the great leaders of the industry says:—

Progress

"I do not believe that men in the electric railway business as a whole can claim to have been anything like as progressive as the men controlling and directing some of the great industrial enterprises in this country. When methods, processes or tools in these industries come in time to be obsolete or on the road to obsolescence these men . . . rip them out and replace them with the most modern and up-to-date processes or tools".

J. W. SHANNAHAN,
President, A. E. R. A.

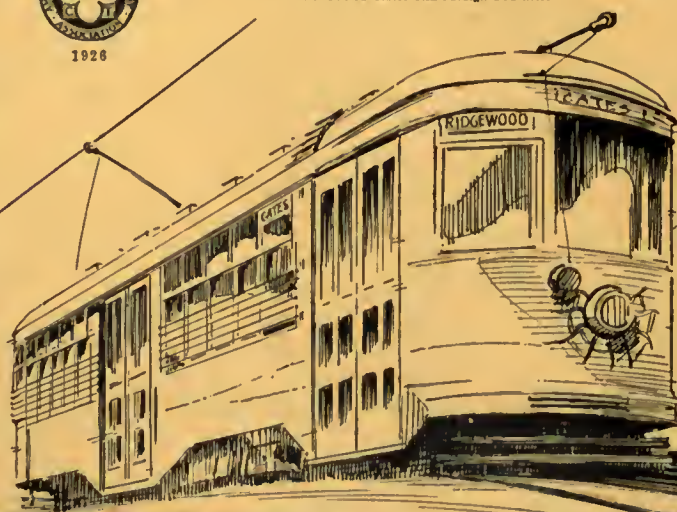
From page 466, September 26, 1925, Electric Railway Journal.

How many of the 28,000 obsolete cars have you?

Modern street cars attract patronage



Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of
the United States and Foreign Countries



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Vol. 67
No. 7

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He Found It in the "Journal"

FAILING to obtain necessary information relative to the skip-stop plan from individual railway companies, William P. Capes turned to **ELECTRIC RAILWAY JOURNAL** and secured the data for which he was searching. Such was the statement of the director of the New York State Bureau of Municipal Research in a talk given at the midwinter meeting of the New York Electric Railway Association.

Besides the leadership the **JOURNAL** has earned through its editorial pages, its files are the log book of the industry. For more than 41 years it has accurately recorded and interpreted the events and progress of the utility that serves three out of every four people who travel daily between home and work.

McGRAW-HILL PUBLISHING CO., INC.

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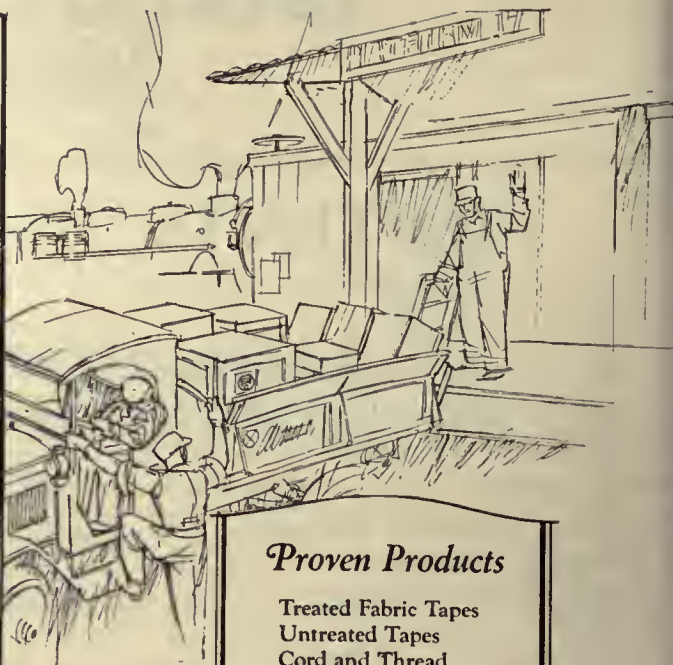
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Cable Address: "Machinist, N. Y."

Publishers of
Engineering News-Record
American Machinist
Power

Chemical and Metallurgical Engineering
Coal Age
Engineering and Mining Journal-Press
Ingenieria Internacional
Bus Transportation
Electric Railway Journal
Electrical World
Electrical Merchandising
Radio Retelling
Journal of Electricity
(Published in San Francisco)
Industrial Engineer
(Published in Chicago)
American Machinist—European Edition
(Published in London)





"Like Owning a Million Dollar Testing Laboratory"

"SAY, Bert," called the superintendent, swinging around in his chair, "better add some Westinghouse soldering flux to that requisition I gave you the other day."

"Too late, Bob," regretted the P. A., "The order went right through. The goods will be here shortly. Those Westinghouse people surely ship promptly."

"You like those Westinghouse materials, don't you?" he added.

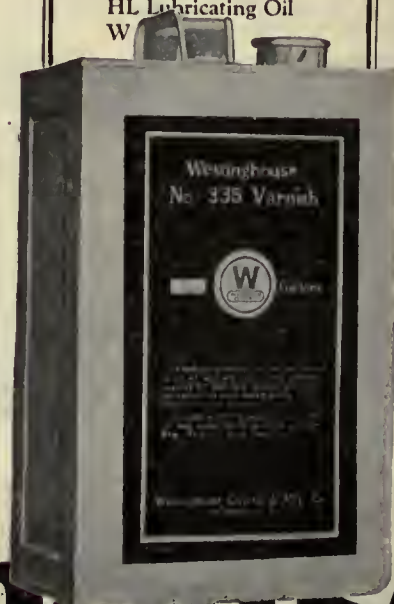
"You bet I do," Bob responded heartily, "It's just like owning a million dollar testing laboratory when we buy our insulating materials from Westinghouse. The things we buy, they have already tested for their own use. You can't beat Westinghouse insulating materials."

"That's true," agreed the other. "It's convenient for me, too. When ordering supplies, I just send Westinghouse all orders for insulating materials. It saves work and I am sure we are getting the best."

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania,
Sales Offices in All Principal Cities of
the United States and Foreign Countries

Proven Products

Treated Fabric Tapes
Untreated Tapes
Cord and Thread
Sleeving
Treated Papers
Treated Fabrics
Untreated Papers
Untreated Fabrics
Asbestos
Fullerboard
Micarta Sheets
Micarta Tubes
Micarta Formed Shapes
Mica Sheets
Mica Tubes
Varnishes
Paints
Japans
Enamels
Insulating Compounds
Insulating Glue
Soldering Flux
Transformer Oil
Switch Oil
HL Lubricating Oil
W



1926

Westinghouse

X84572



“He Will Get Across!”

“Will he get across?” is the question that too often, and needlessly, flashes to mind when one sees a car start over a grade crossing—especially if a locomotive is approaching.

“Will he get across?” implies the hazard that always goes with the unprotected crossing.

It gives way to a feeling of “He *will* get across,” when crossings are protected with

National Trolley Guard

When National Guard is on duty the chance of stalled cars due to trolley jumping is eliminated. The guard forms a trough over the wire, catches the wheel if it jumps and furnishes the power necessary to carry car and passengers to safety.

National Trolley Guard is cheap and reliable protection against crossing accidents.

Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada



National Trolley Guard is an inverted trough of galvanized iron or phono-electric wire mesh—light in weight, easily installed and cheaply maintained.



Ohio Brass Co. 14-B

PORCELAIN INSULATORS LINE MATERIALS RAIL BONDS CAR EQUIPMENT MINING MATERIALS VALVES



The WHITE COMPANY adopts Westinghouse Air Brakes!



Westinghouse Air Brakes

—develop a retarding force sufficiently powerful for stopping even the heaviest bus quickly to increase safety and permit faster schedules.

—provide automatic equalization to minimize skidding and lengthen life of brake linings.

—relieve the driver of braking fatigue to increase safety and utility.

—and permit use of metal brake linings to provide still greater safety and economy.

AFTER thorough trial, both in rigid tests on demonstration cars and in actual service, The White Company has given the stamp of approval to Westinghouse Air Brakes by adopting them, together with metal shoes, as standard factory equipment for the Model 50-B Bus—thus assuring for all users a degree of operating safety and utility not otherwise obtainable.

WESTINGHOUSE TRACTION BRAKE CO.

Automotive Division, Wilmerding, Pa.



**HAND
CONTROL**

WESTINGHOUSE

Automotive AIR BRAKES

**FOOT
CONTROL**





Twin Ties Being Installed Under Traffic in Kansas City

Under traffic if you must

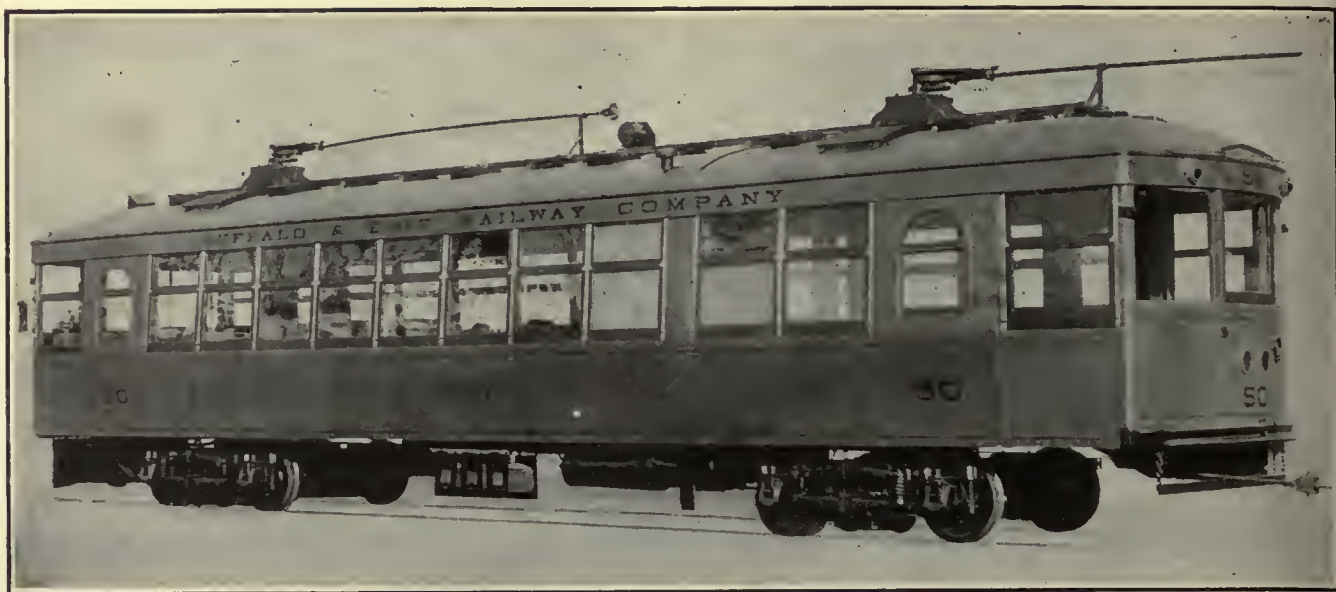
Various methods of installing Twin Tie track under traffic have been worked out during the past three years.

They are the subject of a special bulletin which we will be pleased to send to interested engineers and managers.

The International Steel Tie Co.
Cleveland, Ohio

Steel Twin Tie Track

Renewable Track — Permanent Foundation



Safety Car Control Equipment used by this progressive road

The Buffalo and Erie Railway, an interurban line running between these two cities, recently replaced their two-man cars with modern light-weight equipment designed to provide more attractive transportation for patrons at less cost to the operator.

Among the several factors by which decided economies have been effected is this—the new cars are operated by one man whose duties are safeguarded and simplified by complete protective and labor-saving devices—The Safety Car Control Equipment.

Undoubtedly there are other properties which have the potentiality for better and more profitable service if they were thus modernized.

It is a Safety Car
if equipped with
our standard
Safety Car Control
Devices



SAFETY CAR DEVICES CO.

OF ST. LOUIS, MO.

Postal and Telegraphic Address:

WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

(3092)

*13,000 Cars now have our complete
Safety Car Control Equipment*



Esprit de corps!

To improve the esprit de corps of your men let their personal equipment be of a type to inspire pride in their appearance and workmanship.

Well-made uniform caps, with legible, neatly lettered enamel badges enhance the men's appearance. Buttons, too, are an important part of the uniform. This reflects to the credit of the company.

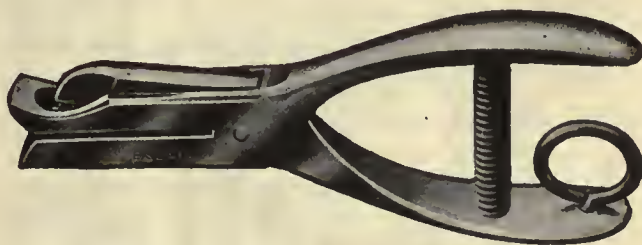
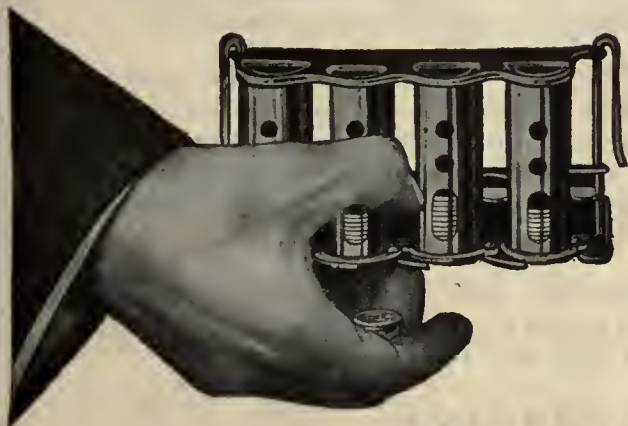
As another instance, change carriers enable the men to make change more quickly and more accurately, as well as speeding up service—especially on one-man cars.

Full descriptions of other Keystone Specialties for employees, which are equally important in raising morale, can be found in the *Essco Catalog No. 7*.

ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA	NEW YORK	CHICAGO
17th and Cambria Sts.	80 Church St.	Illinois Merchants' Bank Bldg.
PITTSBURGH	BOSTON	SCRANTON
839 Oliver Building	86 Broad St.	316 N. Washington Ave.
	DETROIT	
	General Motors Building	
Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver		

KEYSTONE EQUIPMENT FOR EMPLOYEES





Pantasote and Agasote

The universally approved standard of practice

For more than 25 years, the steam railroads, the Pullman companies and the great majority of electric railways throughout the World have consistently specified Pantasote for seats and curtains; Agasote for roofs headlinings and interior trim.

The surface coating of Pantasote is a secret preparation free from either rubber or pyroxylin. It is absolutely impervious to sunlight, water or grease, permanently fade-proof, and very easy to clean.

The process employed in its manufacture makes it practically homogeneous with the fabric base, eliminating all possibility of peeling. It will not harden, crack or flake off under any climatic conditions or in any

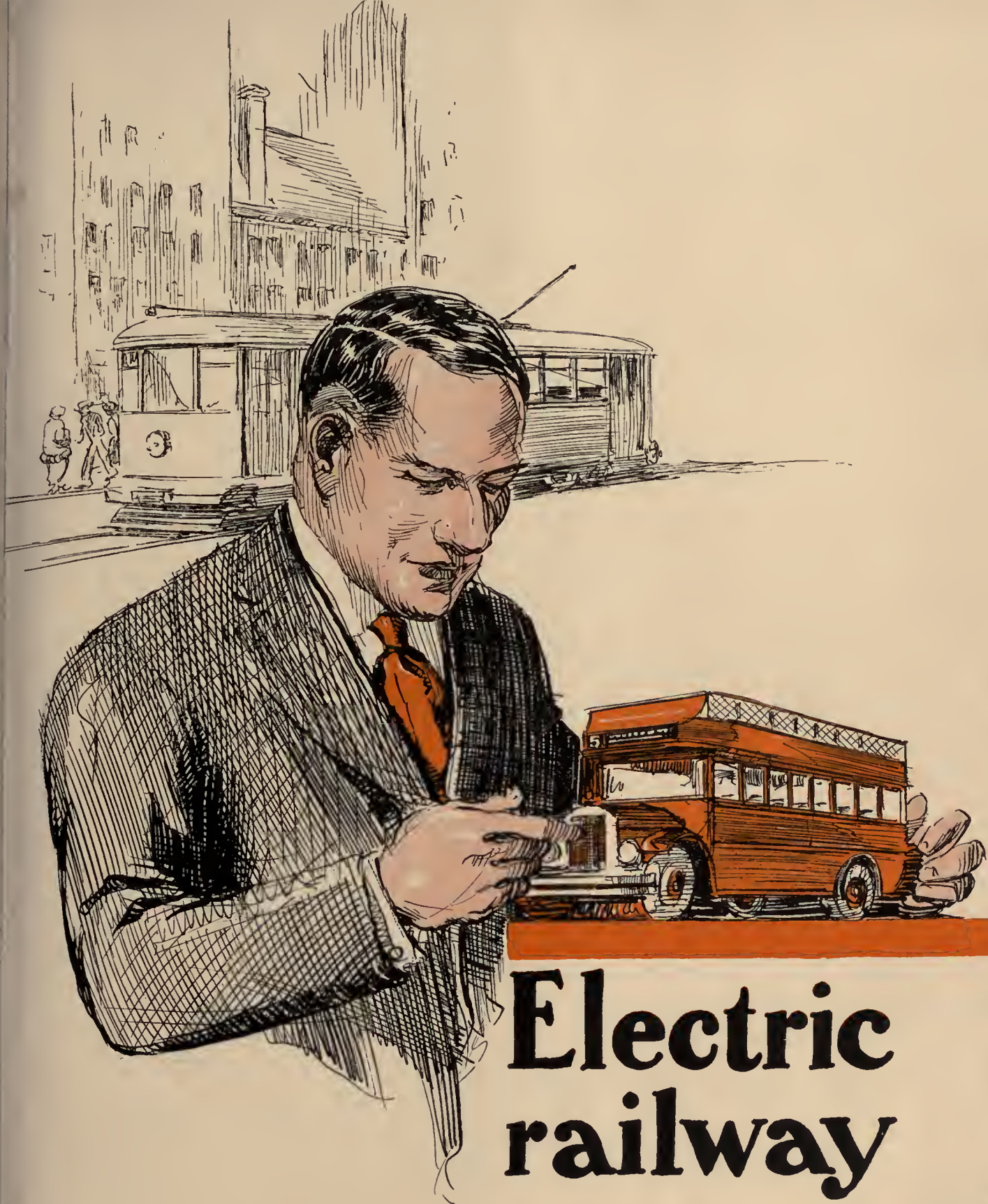
natural temperature. Furthermore, it is not inflammable; even a lighted match dropped on a seat will not burn a hole.

Agasote is an absolutely homogeneous fibre board, made especially for use where accurately curved surfaces are required.

There are no points of possible separation, no grain as in wood, and no laminations as in built-up ply-woods and veneers. Hence, splitting, warping, or peeling is impossible, no matter what the conditions of service and exposure may be.

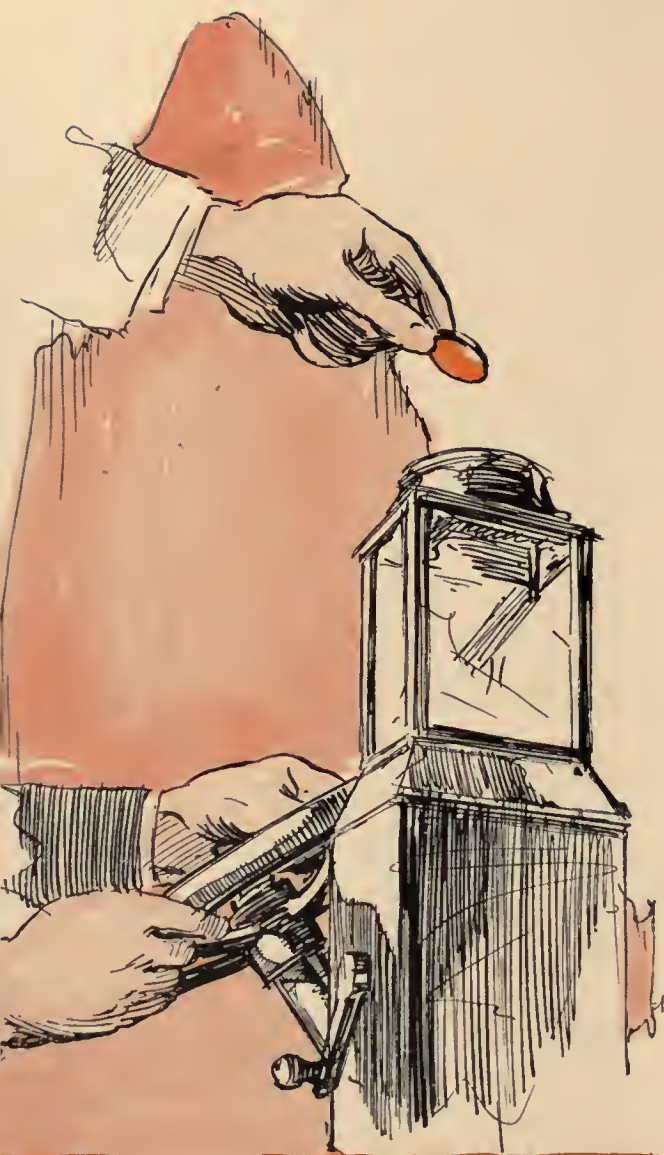
Specify and insist upon Pantasote and Agasote for new cars and for rehabilitation. *In the end it always pays!*





Electric railway men





Build and operate Yellow Coaches



IN offering to electric railways the benefit of hundreds of years of accumulated executive experience in motor coach construction and operation, Yellow Coach through the personal railway experience



of its leading executives, is particularly close to the railway problem. Primarily an organization selling economical and reliable transportation as a business in which the moto

coach plays its proper part in securing *low-cost, profitable miles*, our personnel of management is built around men who have faced operating problems for years in branches of operating, traffic and maintenance. And to this personnel the



electric railway industry has contributed liberally.

Electric railway management is not interested in motor coaches merely as vehicles that run.

Such management *is* interested, however, in motor coaches as vehicles that *earn*, when fitted correctly into an existing transportation system.

It is on the basis of securing *low-cost*,

YELLOW

profitable mileage that we offer our cooperation, the best of our thinking and the operating experiences that originate in our vast laboratory where motor coaches built and operated by members of the Yellow Coach organization pile up a grand monthly total of 2½ million miles on the streets of New York, Chicago and St. Louis. And these same motor coaches carry 150,000,000 passengers every year, in comfort and safety.

The service we offer to railways is therefore *bigger* than the motor coach itself. It is expressed in the following terms—

Economical and reliable transportation, which means:

1. The proper sort of accommodation to the public: guaranteed comfort, reliability and safety—
2. With profit to the operator.

Yellow Coach engineers will be glad to cooperate in making any transportation survey. Such work will be undertaken with an intimate appreciation of the railway problem. You will find that we talk your language.

Write for catalogs, blue prints and other interesting data.



COACHES

Every department is influenced by Yellow Coach management —

IN THIS space we are listing the experience records of various executives found in the Yellow Coach organization. These men, deeply-rooted in all phases of transportation, are typical of the personnel that influences the work of every department. Drawn from the great motor coach operating centers of the world, their experience sets the standard for securing *low-cost, profitable miles*.

GEORGE A. GREEN, *Vice-President*, is typical of the class of men who make up the personnel of Yellow Coach management. His experience record clearly indicates his influence as a pioneer in the field of passenger transportation by motor coach, and he is largely responsible for the development of this form of service to its present well-established position of public usefulness. Extensive knowledge of operation and manufacture abroad was acquired by many years' association with European manufacturers, including the London General Omnibus Company, with which organization he served as Works Manager and Assistant Engineer. This knowledge was supplemented by ten years' activity as Vice-President, General Manager and Chief Engineer of the Fifth Avenue Coach Company, of New York City. With this vast background of successful experience, Mr. Green came to the Yellow Coach Manufacturing Company as Vice-President and General Manager in 1922. He is also Vice-President of the Chicago Motor Coach Company and the Yellow Sleeve Valve Engine Works, Inc., in the management of which he takes a very active part.

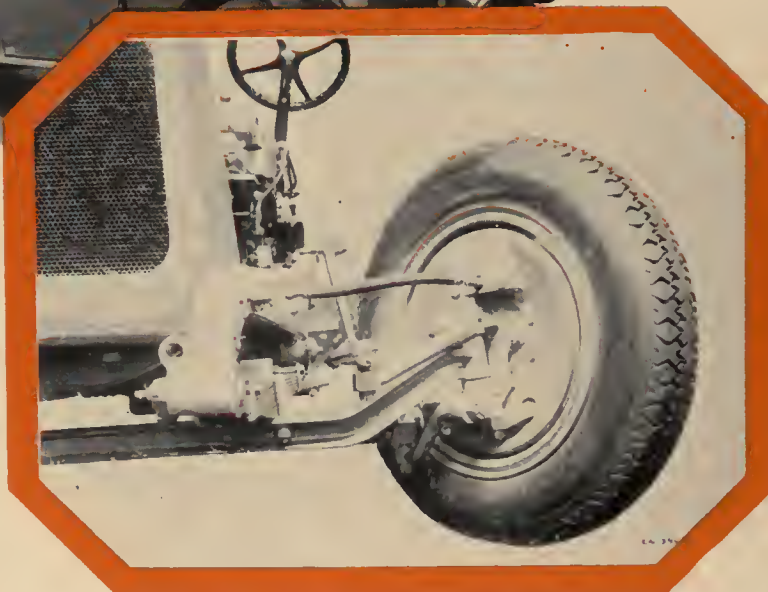
Men of this calibre are at your service to work out *your* transportation problems.



*There is no substitute
for experience —*



Type Y 25-30
Passenger Parlor Coach
operated by the
Portland-Seattle Stage
Company, Olympia, Wash.



Model Y chassis-view
giving idea as to
turning radius



Transportation experience expressed in the *turning radius!*

TURNING radius is an important factor in motor coach operation, especially under conditions of congested traffic.

In the design of Yellow Coaches, operating experience has provided for a turning circle that is exceptional and approaches that of the average automobile. The turning radius of "Y" Type Yellow Coaches, for ex-

ample, is only 31 ft. 2 in. Front wheels may be set at an angle of 43 degrees, and this lock is obtained without the use of the customary bent drag link.

It is features like these, directly affecting operation on the road, that distinguish Yellow Coaches and help build their reputation for securing *low-cost, profitable miles.*

YELLOW TRUCK & COACH MANUFACTURING COMPANY
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.



Grand Rapids Chooses

Readers of this advertisement may remember noting the quick, convenient and efficient operation of the National Pneumatic Door Operating Equipment on the St. Louis Car Company's "Grand Rapids" Car, exhibited at Atlantic City.

The sample has now proved itself in service and 27 of these cars have been ordered equipped with National Pneumatic Door Engines and Door Shafts, Folding Step Devices, Automatic Treadle Exit Doors, Controls and Signal Lights.

Details on request.

NATIONAL PNEUMATIC COMPANY

Executive Office, 50 Church Street, New York

General Works, Rahway, New Jersey

CHICAGO MANUFACTURED IN PHILADELPHIA
TORONTO, CANADA, BY
518 McCormick Building Railway & Power Engineering Corp., Ltd. 1010 Colonial Trust Building

American BROWN BOVERI Power Rectifiers

Efficient in Sub-Station Service
under extreme load variation

Widely used in Europe for a number of years, Mercury-Arc Power Rectifiers have found their most popular application in the electric railway field. Their ability to effectively handle the fluctuations in load on railway lines without material loss in efficiency, from no-load, to high overload, is proved. There is no inertia of heavy rotating parts to be overcome.

On the accompanying chart are curves showing the comparative efficiencies of the three classes of conversion equipment—Rectifiers, Rotaries and Motor-Generators. This data was developed from actual tests. Note the great advantage of the mercury-arc rectifier at one-quarter load, an ordi-

nary condition on traction lines in non-rush hours.

Other advantages of the Mercury-Arc Power Rectifier are:—absolutely quiet operation, no moving parts except small auxiliaries, adaptable to full automatic operation, minimum maintenance required.

Further details of the principles, construction and operating features of this equipment will be given in subsequent advertisements.

Brown Boveri engineers have developed the Mercury-Arc Power Rectifier to a high degree of perfection in Europe. We are now prepared to build and install this type of equipment in America.

Products of American Brown Boveri Electric Corporation

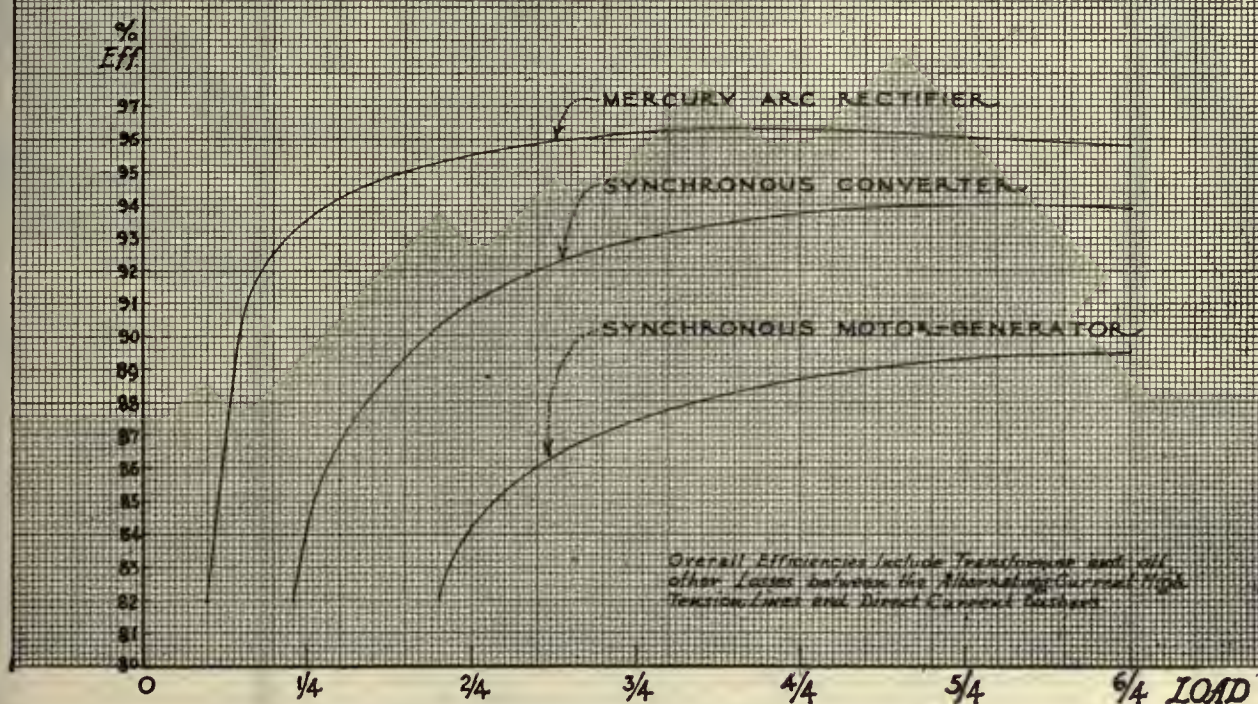
*Electric Locomotives
for any system of current, high or low
tensions
Complete Equipment
for railway electrification
Mercury-Arc Power Rectifiers
(steel enclosed)
Diesel-Electric Locomotives
Mining Locomotives*

*Motors (all sizes and types)
Rotary Converters
Motor Generators
Transformers (power or current)
Switches, Controllers
and all Auxiliary Equipment
Oil Switches
Condensers and Auxiliaries*

*Steam Turbo Generators
for normal or high pressures and
superheats
Automatic Regulators
Relays
Turbo Compressors and Blowers
Electric Furnaces
Induction Regulators*

Recommends

Mercury Arc—Steel Enclosed Power Rectifiers for Sub Station Service

Comparative Overall Efficiencies of Converting Apparatus*Graphic Comparative Efficiency with Rotative Equipment*

Mercury-Arc Power Rectifiers pay for themselves quickly where D.C. load factor is variable or low.

In addition to their recognized position in the railway field, they can advantageously replace rotating equipment in Cen-

tral Station distribution and industrial application, not only because of their great efficiency, but because they are noiseless in operation, cause no vibration, do not require special foundation and occupy a minimum of space.

American Brown Boveri Electric Corporation

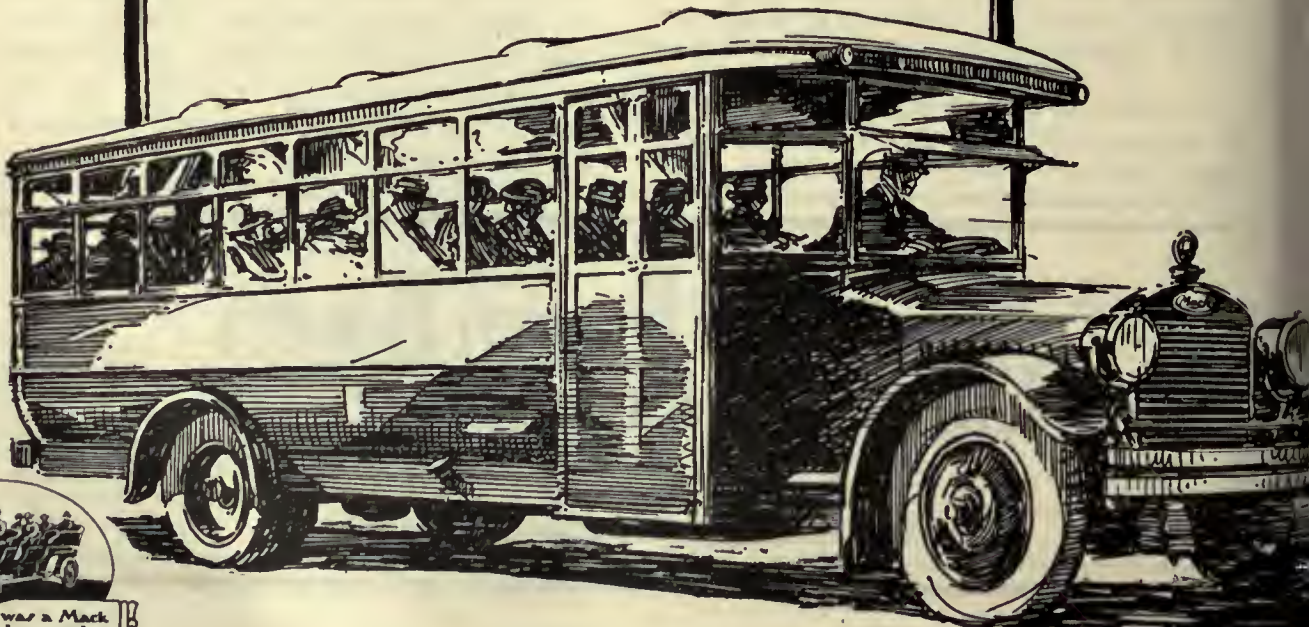
Plants at Camden, New Jersey

Main Office: 165 Broadway, New York

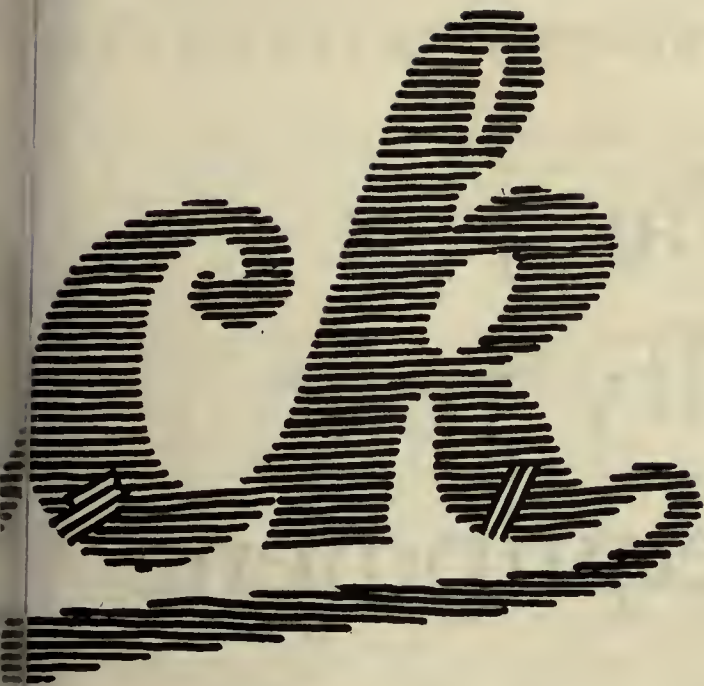
The Operator's Check

Partial List of Electric Railways Now Operating Mack Buses

Municipal Tramways Trust, Adelaide, S. Australia
 Illinois Power & Light Corp., Chicago, Ill.
 The Connecticut Co., New Haven, Conn.
 Chicago, West Towns & Northern Railroad, Chicago, Ill.
 Lehigh Traction Co., Hazleton, Pa.
 United Electric Railway Co., Providence, R. I.
 Columbus Railway, Power & Light Co., Columbus, Ga.
 Boston Elevated Railway, Boston, Mass.
 Waterloo, Cedar Falls & Northern Railroad, Waterloo, Iowa
 Northern Ohio Traction & Light Co., Akron, Ohio
 Illinois Power Co., Springfield, Ill.
 Boston & Worcester Street Railway Co., Framingham, Mass.
 Mississippi Valley Electric Co., Iowa City, Iowa
 New Orleans Public Service Co., New Orleans, La.
 Tampa Electric Co., Tampa, Fla.
 Chicago, South Bend & Northern Railroad, Chicago, Ill.
 Chicago & Joliet Electric Railway Co., Chicago, Ill.
 Key West Electric Co., Key West, Fla.
 Iowa Southern Utilities Co., Inc., Des Moines, Iowa
 Holyoke Street Railway Co., Holyoke, Mass.
 Durham Public Service Co., Durham, N. C.
 Coast Counties Gas & Electric Co., San Francisco, Cal.
 Hartford & Springfield Street Railway Co., Hartford, Conn.
 Worcester Consolidated Street Railway, Worcester, Mass.
 Youngstown Municipal Railway, Youngstown, Ohio
 Binghamton Railway Co., Binghamton, N. Y.
 Wisconsin Power & Light Co., Madison, Wis.
 Kansas City Railways, Kansas City, Mo.
 Iowa Railway & Light Co., Des Moines, Iowa
 Omaha & Lincoln Railway & Light Co., Omaha, Neb.
 Arkansas Central Power Co., Little Rock, Ark.
 City of Ashtabula, Ashtabula, Ohio
 Twin City Rapid Transit Co., St. Paul, Minn.
 Wilkes-Barre Railway Co., Wilkes-Barre, Pa.
 Phillipsburg Traction Co., Phillipsburg, N. J.
 Wilmington & Philadelphia Traction Co., Wilmington, Del.
 Nashua Street Railway Co., Nashua, N. H.
 Union Street Railway Co., New Bedford, Mass.
 Baton Rouge Electric Co., Baton Rouge, La.
 Lordship Railway Co., Bridgeport, Ct.
 Municipal Railway, Eureka, Calif.
 Trenton & Mercer County Traction Corp., Trenton, N. J.
 Illinois Power & Light Corp., Decatur, Ill.
 Wichita Ry. & Light Corp., Wichita, Kans.
 Topeka Railway Co., Topeka, Kans.
 Illinois Power & Light Corp., Bloomington, Ill.
 Duluth Street Railway Co., Duluth, Minn.
 Mesabe Railway Co., Virginia, Minn.
 Kansas City, Leavenworth & Western Ry., Kansas City, Mo.
 Oklahoma Union Railway Co., Tulsa, Okla.
 Virginia Ry. & Power Co., Norfolk, Va.
 Syracuse Co-ordinated Bus Line, Inc., Syracuse, N. Y.
 Utica Co-ordinated Bus Line, Inc., Utica, N. Y.
 Third Ave. Ry., New York City
 Camden & Suburban Ry., Camden, N. J.
 Dubuque Electric Co., Dubuque, Ia.
 East St. Louis Ry. Co., East St. Louis, Ill.
 Los Angeles Ry., Los Angeles, Cal.
 Hudson Transit Corp., Newburgh, N. Y.
 Newburgh Public Service Corp., Newburgh, N. Y.
 Pittsburgh Ry. Co., Pittsburgh, Pa.
 Savannah Electric & Power Co., Savannah, Ga.
 Tacoma Railway & Power Co., Tacoma, Wash.
 Yakima Valley Trans. Co., Yakima, Wash.
 Westside Electric St. Ry. Co., Charleroi, Pa.
 White Stage Lines, Tampa, Fla.
 Lehigh Valley Transit Co., Allentown, Pa.
 Wellington City Council, Wellington, New Zealand.



The first bus was a Mack
—the first Mack was a bus



Mack—the universal word used by Street Railways

Street railway companies have adopted another word for performance.

That word is *Mack*. It is used broadcast for new and re-orders.

"Give us Macks," said the Boston and Worcester Street Railway Company.

They said it first in June, 1925, when five city types were bought and placed in operation. They said it again in December when two more city type Macks were added.

Every day their sturdy Mack buses stand the gaff of heavy peak loads over a $7\frac{1}{2}$ mile loop, feeding to the main trolley line.

At times, from 60 to 65 passengers crowd in, but the Mack stands the strain and the fleet yields a good profit.

Nothing unusual in this! It is all part of the day's work for the Mack bus, *wherever* it is operated. And as days of economical service lengthen into years, it is easy to understand why Mack and *performance* mean the same thing.

MACK TRUCKS, INC.

INTERNATIONAL MOTOR COMPANY

25 Broadway, New York City

One Hundred direct MACK factory branches operate under the titles of: "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," "MACK MOTOR TRUCK COMPANY," and "MACK TRUCKS OF CANADA, LTD."



The
Mack
Bus

GAS-ELECTRIC DRIVE MEANS

Just as you
specify your
car equipment

—specify General Electric
drive for buses also and be
assured of motive power that
you know from actual
experience to be reliable.
General Electric is the
pioneer in the building of



Consult the General Electric
Company before you buy
buses to be sure proper
electrical equipment is
applied. Best results are
obtained only when service
and grade conditions have
been considered.

Gas-Electric Drive
(for buses and trucks)

GENERAL
GENERAL ELECTRIC COMPANY, SCHENECTADY, NEW YORK

LOWER COST FOR BETTER TRANSPORTATION

IT'S easy enough to specify buses complete with mechanical drive, *but* experience has shown that such buses are not the best suited for satisfactory transportation service, nor the best in point of long, useful life.

When you buy new cars you choose the motors, the control, brakes and trucks. Nearly all the major items are specified in accordance with your knowledge of the different types and your confidence in the manufacturer.

Maintenance Advantages

Inspection and testing of engine are simplified, made systematic and conclusive.

Engine cannot be raced or stalled and average engine speed is lower—prolonging life of bearings, pistons, cams and all other moving parts.

Clutch, gears and differential—all subject to high maintenance—are eliminated.

Without the shock of gear changing, the life of engine, chassis and body is longer.

Uniform torque of electric drive means less tire wear.

Engine lubrication is materially less.

You can exercise the same studied judgment in selecting motor bus equipment.

Gas-Electric Drive is a much-needed improvement, which means easier operation, smoother running, faster acceleration, less vibration, less maintenance and longer life. It is available for practically any standard make of bus chassis—and it's General Electric.

Operating Advantages

Greater riding comfort—no vibration or jerks during starting, and smooth acceleration.

Increased safety—control entirely in foot pedal relieves operator's hands for steering—skidding is minimized by individual drive on rear wheels—engine cannot stall on dangerous crossings.

Higher schedule speeds—through more rapid acceleration and reduction of driver fatigue—affording lower costs and higher receipts.



ELECTRIC

SALES OFFICES IN ALL LARGE CITIES



**Why do they use
G-E Carbon Brushes
on the "Milwaukee"
—and other leading roads?**

Because G-E research made them and maintains their quality. Because G-E motor-building experience is back of them. Because there is a *right* G-E Brush for each commutation requirement. Because nothing but the best will do.



GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN ALL PRINCIPAL CITIES

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Co., Inc.

MORRIS BUCK, *Managing Editor*

Volume 67

New York, Saturday, February 13, 1926

Number 7

Personality a Great Asset to Electric Railway Officials

DETERMINATION of whether or not a certain man possesses the requisite qualities to become a good electric railway executive cannot be made according to any general rule. Neither experience nor education alone, nor a combination of the two, is a guarantee of fitness. In the past the importance of qualifications other than experience has not always received the attention which it deserves. Nowadays it is receiving more consideration.

It is not enough for an executive in the utility business to know his own job thoroughly. That, of course, is an essential. But to be really successful he must be more than a good engineer or a good operating man. He must have a personality that encourages friendliness and creates confidence.

Wars are caused by lack of understanding. Specific conditions may be the immediate reason for their outbreak, but failure to understand the point of view and the thinking of the other side in the controversy is the underlying difficulty. This is just as true of conflicts between the public and the utility company as it is of conflicts between nations, and nothing can be more unprofitable for a utility than a war with the public it serves.

The man who can do the most for an electric railway company is often the man who can go before the people and tell them what his company is trying to accomplish, how it is trying to serve them, and the difficulties with which its operation is beset. A successful utility executive need not necessarily be a talented public speaker, but he should at least be able to tell the story of his company in simple, straightforward language that every one can understand. When a selection is to be made of a man to fill some executive position, length of service should not be the determining factor, but rather his ability to operate successfully and inspire a feeling of general confidence that things are being properly managed.

Did the Eastern Massachusetts Trustees Do the Job Too Well?

AN EXTRAORDINARY job was done in rehabilitating the Eastern Massachusetts Street Railway. That is history. It has all been made plain before. Now the question arises about the proper place of the investor. That is a legal point for the courts to settle. A special master, reporting to the courts, has reviewed the affairs of the company at length. His findings make interesting reading. As indicated in *ELECTRIC RAILWAY JOURNAL* for Feb. 6 the master's report sets forth the financial policy of the trustees and the present condition of the company. His was a fact-finding inquiry. The problem before the court is to construe the intention of the statute under which the road is run. Earn-

ings have been put back into the property liberally, too liberally apparently to suit some.

There is no need here to do more than animadvert to the facts established by the special master. The issues involved are of course of primary interest to the investor, but those who followed the vicissitudes of the company in the early days and studied the work of the trustees in re-establishing the company have an economic interest in the case. The thought that occurs is that if the trustees had done less than they did, there probably would not be anything upon which to raise the question now propounded. The thoroughness of their job is shown by the statement that even in the face of decreases in gross earnings the net operating revenue has been stabilized by economies and maintained without great variation since 1921 even under reductions in fares. Surely this is an extraordinary record. The trustees took the position that their right to apply income to rehabilitate the road was not limited to the depreciation accruing after the new company was incorporated, but included depreciation which accrued before that time. As the special master points out, the company has been honestly managed, its assets prudently conserved and the capital values enhanced by the earnings put back into the property. There would be little doubt about the propriety of this procedure under private operation. In this case, however, under the provisions of the special act settlement of the question that has been raised may depend on different principles.

There Is Only One Danger in the Daily Dozen

STUBBORN, indeed, would be the condition in the electric railway industry that did not yield under the persistent application of the code which Mr. Storrs prescribed at Indianapolis. Note the word persistent. That is important. It is a daily dozen, not an occasional dozen. Necessarily, Mr. Storrs had to generalize. He was not dealing with any particular case. There was no real need for him to be specific. Indeed, his method of treatment did not permit of it. Instances of the beneficial results of the practice by electric railways of all the homely virtues prescribed by Mr. Storrs are not far to seek. In fact, the very meeting at which he spoke furnished one of the best examples of this. It was a coincidence that the paper by Mr. Budd was presented at Indianapolis. Was ever more striking evidence furnished than by Mr. Budd to show that the exercises were not only well suggested but that their diligent practice pays?

Measure the Budd speech and the known accomplishments of many other roads in terms of the Storrs suggestions! It is great mental exercise. Mr. Storrs said: "Let us not say that a thing cannot be done." That, in-

deed, is dangerous in the light of accomplishments on the Insull properties, on the roads that have won the Coffin award, on the roads that have competed for that award and on those that have been resuscitated financially but for one reason or another have not been competitors for that award, to say nothing of many others. One who does hold either to the thought that it cannot be done or who says it cannot be done may be awakened from his attitude of negation by the proof that it has been done. Instance upon instance is on record of accomplishment in this industry if one will only put into practice the first of Mr. Storrs' principles of conduct, the one that advises exercise of the eyesight.

Pains were not spared by *ELECTRIC RAILWAY JOURNAL* to place before the industry both the Storrs speech and that of Mr. Budd. There is no intention here to attempt to recapitulate them. There is, however, just one more thought. As Mr. Budd so aptly said, problems are not peculiar to the electric railways. Every business has its troubles. Self-commiseration is a calamity for those who practice it. There are men in the electric railway industry capable of grasping the vast transportation opportunities. Any other conclusion is untenable. The facts belie it. There is one danger and only one in the daily dozen—it may not be practiced by some to the extent that it deserves.

The Sting Was the Sting of the Wasp

TACOMA has a Mayor who is a perpetual candidate for that office. He has been in and out of the post ever since 1896. He is one of those anomalies peculiar to American politics that are difficult, indeed, to explain. The perpetual candidate of Tacoma is A. V. Fawcett. He has been against the street railway first, last and all the time. To him change in ownership of the property has made no difference. In 1922 he was elected to serve until 1926 on a platform of 5-cent street car fares. He will undoubtedly run for re-election in the spring. It is the probable outcome of that election which is agitating the city.

Tacoma's street railway management is progressive. The operators are among the ablest in the industry. At the incoming of the Mayor for his present term the railway put into effect the \$1 weekly pass. This \$1 pass was kept in force until Sept. 15, 1924. During the 26 months the pass was sold at \$1 it proved extremely popular. More than 60 per cent of the riding was on the pass at an average fare of 3½ cents. Riding increased, but extra service had to be given at a lower average fare. Beginning on Jan. 1, 1924, the company conducted a campaign for relief from burdensome franchise restrictions so that the \$1 rate might be continued. This movement, backed by the federation of local improvement clubs, was successfully blocked by the Mayor. As a result the price of the pass had to be raised to \$1.25. These facts are related so that the picture may be reasonably complete.

As the Mayor pretended to see it, 100 palaces on wheels, as he refers to buses, run at a 5-cent fare would drive the street cars out of business and make a lot of money for their operators. It is just here that theory and fact have been shown to part company. For some time 22 jitneys have been run over routes paralleling the street car lines, but the jitney company on which the Mayor has pinned his hopes is growing restive. One of its officers has openly accused the

Mayor of sacrificing the stockholders to further his own political interests. The jitney company has thrown open its books to show that not in a single month of its eighteen-month period of operation has there been a profit. Anybody who knows anything about the transportation business could have foretold this result. The voice of the railway would, however, have been a voice in the wilderness. Mayor Fawcett is not the first public official of his kind. It is one thing to have a bee in the bonnet, but it is quite another to be stung by a wasp.

Blocking of Public Transportation in Snowstorms Demands Vigorous Methods

NOT so many years ago a snowstorm was hailed with delight by the street railway manager, as it would bring in extra revenue that would far more than balance the cost of cleaning the tracks and making incidental repairs to the equipment. The recent heavy snowstorms along the Atlantic coast, however, have shown that there is danger of complete paralysis of public transportation under such conditions unless more stringent limitations are put on the operation of private automobiles and motor trucks.

Particularly in Boston and New York have conditions been bad. The surface railways have done their part and more in cleaning snow off their tracks and keeping the lines open. But no sooner has the way been cleared than a procession of miscellaneous motor vehicles has crowded in on the tracks and made it virtually impossible to move traffic of any kind at more than a snail's pace. Worse than that, in not a few instances vehicles have become stalled in such positions that they blocked the tracks and then have been abandoned. Reports from Boston indicate that in numerous cases this happened. Complete cessation of rail service ensued until the obstruction could be cleared away. On the other hand the buses operated by the Boston Elevated Railway did not fare so badly. They were able to detour through streets used less by general traffic and so were able to maintain some sort of service.

Public policy dictates that conditions of this sort should not continue. Traffic congestion is at all times an increasingly serious problem. But when a public utility with an excellent organization fights the elements to open the way for the general public, its customers, there is no excuse for the occasional individual, in order to save a little personal discomfort or for the sake of a slight private gain, to discommode the thousands who are looking to the railway to transport them. The city of Boston was scored heavily for failure to anticipate the storm and make provision in advance for clearing away the snow, as did the railway. In New York the very complete equipment of the street cleaning department was used to clear the roadways on streets without trolley tracks, leaving the railways to do the best they could alone, despite the motor vehicular traffic that followed in the wake of the plows.

Managements of transportation systems in all parts of the country where snow blockades are at all common should act to bring city governments to the realization that co-operation in respect to keeping street car tracks and bus routes free from interference in such emergencies is a duty. Whatever ordinances are needed should be passed. But this is not enough. It must be seen to that they are enforced.

Give the Exact Fare to Conductor— Put the Bill on the Plate

WHEN the railway emerged from the dark ages of the "public-be-damned" policy to the halcyon era of the "public-be-pleased" attitude co-operation replaced conflict, but it was more the wisdom of giving a helping hand than the feeling for it that prompted the idea of service plus. This wisdom brought with it the knowledge that co-operation was a business, a scientific one, too, and that like philanthropy, its ally, it needed astute direction if it were to be a success.

Of course, such management did not carry with it the stigma attached to the philanthropy of Jesse James, who succumbed to the entreaties of the old woman to spare her rent for the expected landowner and then in ambush waited for the return of the enriched rent collector. Nor was it comparable with the altruistic impulse of the woman who, upon beholding a bread line on the street, straightway went to the bank to deposit the \$500 her husband had given her to buy a fur coat. No, the administration of co-operation as understood by the railways was on a higher plane. They believed implicitly in the principle that co-operation should bless the one who gives as well as the one who takes, although fundamentally the alpha and omega of the doctrine was that charity can start with advantage at home.

Saving one's own soul is intrinsically not a bad belief, but with the advance in time the solid rock upon which such a code was built gradually crumbled and moldered into the newer ethics which stressed the salvation of one's neighbor. A striking example of this is noted in a recent advertisement by a railway in a local paper. Here it is in part:

"Sunday morning seems to be the worst morning that our trainmen have for making change. Patrons seem to depend upon the street car conductors to 'break' bills so there will be change for the church collections. Why not give the correct amount to the conductor, and put the bills in the collection?"

A mighty swing of the pendulum and the clock has struck for a new co-operation cult obliterating its more sordid parallels. At least one railway is prepared for the change. It has found more gratification in giving than in receiving and has learned that it is more salutary to feel co-operation than to know how to define it. Just as "sorrow does not spring out of the ground," so the causes of co-operation have been imbedded in a well-founded if occult philosophy.

Public Relations Are After All Human Relations

STREET railway men often take themselves too seriously in their dealings with the public. This may be seen frequently in the dignified but stiff appeals found so often in their newspaper advertising. Judging from present trends, the public wants amusement far more than instruction. This is the day of the movie, the radio and the tabloid newspaper. People are headline readers and simply will not take time to read through long statements in small type. In a measure the same principle applies to other forms of publicity as well.

But take a serious campaign, take out the non-essentials and dress up the vital part in attractive form. Lo and behold! The reader has been reached and his confidence gained. Of course, success in winning pub-

lic good will depends on intangible factors, such as doing the right thing at the right time.

The three main factors are relations with newspapers, relations with city officials and relations with the car-riding public, according to L. J. DeLamarter. His paper before the Central Electric Railway Association midwinter meeting, published in this paper last week, is an excellent analysis of methods that can be used to reach these various elements. That Mr. DeLamarter has been successful in this work is testified to by the good public sentiment in Grand Rapids and favorable action in connection with franchise and other matters. Careful perusal of this article should show others not only how one railway has succeeded, but it should suggest methods other operators can turn to good account on their properties.

Personalized Service Might Be Tried on Car Lines as Well as on Bus Lines

LUCIUS S. STORRS, in his recent paper before the Central Electric Railway Association at Indianapolis, said the electric railways were not doing all that they might to attract new business. The trend of passengers carried, varying upward or downward, followed closely the composite curve of the business trend throughout the country.

"By not doing all that they might" has at least two meanings. The operators might do more to attract riding on the old-established rail lines by improved cars and improved facilities in general, and they might do more by improved types of service such as exemplified in the Chevy Chase de luxe line of the Capital Traction Company in Washington, D. C., described in this issue. J. H. Hanna, vice-president of that company, nearly a year ago conceived the idea that there would be an opportunity for a high-grade suburban service, and against the opinion of many railway operators and some bus operators started the 8-mile line.

Naturally an operation of this kind will be an experiment for many months until normal operating costs and normal traffic can be established. Indications are, however, that it will be more than self-sustaining. For the initial period of 2½ months there was an operating deficit, but December and January showed a comfortable net. The important point established, however, is that there is a demand for a superior service. Transportation, like articles of food and dress, must appeal to a wide variety of tastes. Service that is merely a means of transportation from one point to another will be patronized only by the people to whom it is a necessity. Others will find means of transportation more to their liking—and will be willing to pay for it.

To meet this modern demand electric railways in general have only begun. In some cases, as was intimated by Mr. Storrs, they have gone backward. To be sure, there have been signal advances in an ever-growing number of cases. But it is a sad commentary that advances in transportation methods have often been made only when a new type of vehicle such as a de luxe bus has been introduced, and along with it a progressive management has pointed the way to a new standard of service. The electric car, the backbone of the industry, is too often allowed to roll along with the service standards of 20 and sometimes 30 years ago.

Mr. Storrs has stated the case mildly. Why not give more special treatment to the electric car? Why not personalize this service, not alone by publicity but by new equipment, new standards and modernized methods?



The Capital Traction De Luxe Coach Runs Between Chevy Chase and Downtown Washington

De Luxe Coach Service Pays in Washington

Five Months Experience of the Capital Traction Company with the Chevy Chase 25-Cent Coach Line Shows Substantial Net Revenue—The Parallel Street Car Line Has Not Been Affected Materially—Several Factors Have Contributed to the Success of the Service

DE LUXE coach service has now been given by the Capital Traction Company, Washington, D. C., for practically five months with gratifying results. The route, which is 8 miles long, connects Chevy Chase, a widely known high-class suburb lying to the northwest of the city, with the downtown business district, including the Union Station and the Capitol. The fare charged is 25 cents, children under five being carried free. Initially the service consisted of a 20-minute headway in each direction from 7:30 a.m. until midnight, requiring four buses with two in reserve. Shortly after the service was started a fifth coach was used during the morning and evening rush hours, with one in reserve. Patronage developed rapidly and before the end of the year two more coaches were ordered. The headway in certain parts of the day, morning and evening, was cut to ten minutes and seven buses are now necessary to take care of the peak crowds.

The coaches are type Y parlor cars manufactured by the Yellow Truck & Coach Manufacturing Company of Chicago. They seat 21 passengers in individual leather upholstered seats. They are well lighted and attractively finished inside and out and appointments are used that add elegance and comfort. There is a separate

smoking compartment, and baggage racks are provided. Each smoking compartment is equipped with four nickel-plated ash trays. Paper matches are supplied by hotels and others desiring the excellent advertising accruing from such practice. The coaches are cleaned thoroughly inside and out nightly, not just swept out.

Operators are carefully selected and instructed in the art of giving personalized service. They are clad in a special olive green whipcord uniform of military design, differing not only from the uniform of the platform men, but from operators of the regular buses of the company. Woven on the coats and the caps of the uniform is the company's monogram in red. Black leather puttees, black shoes, white collars and black ties complete the operator's distinctive uniform.



Comfortable Individual Seats in This Chevy Chase Parlor Coach Operated by the Capital Traction Company, Washington, D. C., Accommodate 21 Passengers. A Smoking Compartment Can Be Seen in the Rear

The company adheres strictly to the no standee pledge made when this service was started. This keeps the service up to a high standard that appeals to nearly all the patrons. Occasionally, of course, it causes disappointment to persons who are unable to board a bus. Drivers are instructed to stop and explain in such cases that standing in the bus is not allowed. This practice is appreciated, as is evidenced by comments made to operating officials. "Good morning" from the operator helps greatly to

start the morning's transaction pleasantly. Each coach has the operator's name on a brass stencil nameplate mounted on the instrument panel so that the passengers soon know the operators by name. This makes the operator feel that he is a part of the company and helps to make possible the personalized service so greatly desired.

Fares are collected by means of the Rooke system, using a standard register mounted in a special holder.

From the beginning of the service on Sept. 15 there has been a steady growth in the business. The first 2½ months showed operating deficits, but in December the gross business done increased so greatly that it produced a surplus of \$767. January, even without the holiday business, produced practically the same revenue, although expenses were somewhat greater. The operating statement follows:

OPERATING RECEIPTS AND EXPENSES, CHEVY CHASE
DE LUXE COACH SERVICE

	Sept., 1925*	Oct., 1925	Nov., 1925	Dec., 1925	Jan., 1926
Revenues	\$1,644	\$4,377	\$5,150	\$6,769	\$6,746
Expenses	2,550	5,630	5,669	6,002	6,272
Net revenue				\$767	\$474
Operating deficit	\$906	\$1,253	\$519	.....	.....

*Sixteen days only.

In the above table operating expenses include depreciation and taxes, but not interest on the investment.

A study of the appeal that such a service has to the community shows that its greatest attractiveness is to men and women who otherwise might use their private automobiles. The parking problem, severe in Washington as in every other city, is a constantly growing deterrent to the use of private automobiles. In a large sense it creates a demand for just such a service as was started by the Capital Traction Company. While a study of the traffic indicates that the service is used to a great extent by men and women shoppers, it is also used extensively by business people, as is evidenced by the more extensive traffic during the rush hours.

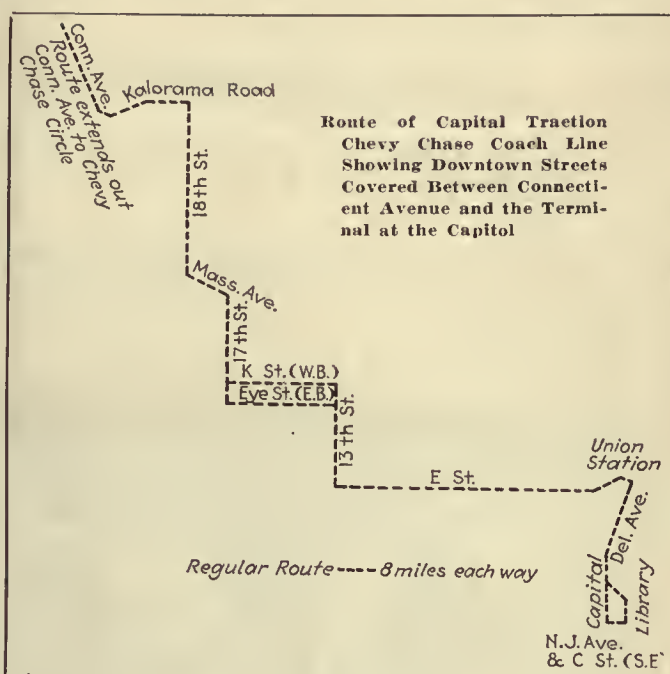
Out of the experience of the coach operators, many incidents have been collected which tell volumes as to the reactions of the passengers and show their appreciation of the service. A few of these instances are cited here:

One parent brings a small child to the coach each morning and the operator lets him off in front of the school.

A lady boarded a coach with two children and paid fare for all three. She told the operator she would gladly take them both in her lap if the coach became crowded. She uncomplainingly did this a little later to avoid having passengers passed by.

At another time a man alighted from a coach two squares from his destination so that a lady might get aboard, as the seats had all been occupied.

Many senators and representatives are patrons of the service. One morning a senator who is a regular rider between his home in Chevy Chase and the Capitol stopped an outbound coach on its way to Chevy Chase and asked the operator to watch out for him on his way down, as he wanted to walk a little of the way. When the coach reached the senator it had a seated load and the operator stopped to inform him and express his sorrow at not being able to carry him. The senator said, "Sanders, you know I must be at the Capitol at 9 o'clock. Give me 2 cents to buy a paper and I will sit on the baggage rack." Operator Sanders gave the senator the necessary 2 cents and the coach proceeded



on its way with the senator riding on the baggage rack.

On one occasion a man was unable to board the coach downtown on its way out to Chevy Chase because it was already loaded. So he took a taxi and followed until some one got off, whereupon he left the taxi and boarded the coach.

In another case a man missed a coach at the Union Station and followed in a taxi until he caught up with it after a drive of about five miles. He then left the taxi and boarded the coach, telling the operator he was still saving a dollar.

One complaint recently registered by a lady said that the coaches were too quiet and that it was dangerous to have them running around when one could not hear them.

To aid passengers unique stop signs painted in Capital Traction green with white lettering have been erected at important points. One of these is shown in an accompanying view. Each sign is specially lettered to indicate the exact time the bus is due to pass. The coaches will stop anywhere on signal for passengers, but of course do not stop at the designated points unless signaled.



Bus Stop Sign

This stop sign is a ride-selling feature. It gives the actual time the bus can be expected.

of course considerably higher than is possible on the street car line.

Inauguration of this service was made by J. H. Hanna, vice-president in charge of operations of the Capital Traction Company, by sending out about 1,200 individual typewritten letters. A reproduction of one of these appears elsewhere. To the same list booklets

From the Chevy Chase terminal to Thirteenth and F Streets, in the principal shopping district, the running time is 24 minutes and to Union Station 31 minutes. This schedule is slightly in excess of 15 miles per hour for the eight-mile run. It is

THE CAPITAL TRACTION COMPANY

General Offices, 36th and M Streets
Washington, D. C.

September 12, 1925.

Mr. John Doe,
1234 Connecticut Avenue,
Washington, D. C.

Dear Sir:

We wish to call to your attention the fact that this company will begin operating on September 15th a special parlor-car coach line between Chevy Chase Circle, the shopping, theater and business districts, the Union Station and the Capitol. The line is to be called the Chevy Chase Coach Line.

We have purchased 6 of the latest type motor coaches for use on the Coach Line. They are unequalled, we believe, in riding comfort, luxuriousness of appointment, attractiveness and, of course, safety and mechanical detail. They have individual seats—there will be no standees on the Coach Line, at any hour—smoking compartments, baggage racks, and will be operated by men chosen specially, who are instructed to pay the greatest attention to the comfort and convenience of passengers.

We feel there is a demand for this form of public transportation, more luxurious and speedier than may be given by a street car, but furnished at a price far below that of the taxi-cab or the cost of private automobile operation. Coaches will run every 20 minutes throughout the day, from a little after seven a. m., until midnight.

The route: South from Chevy Chase Circle over Connecticut Avenue to Kalorama Road; east to 18th Street, south to Massachusetts Avenue; east to 17th; south to Eye; east to 13th; south to E; east to Union Station Plaza; east over Delaware Avenue and through the Capitol grounds, to New Jersey Avenue and C Street, Southeast.

On the return trip coaches will go east and north around the House Office Building, past the Library of Congress, before entering the Capitol grounds. At 13th Street, where they turn north, they will continue to K before turning west. Otherwise the west and north route follows the same streets as the south and east.

We recommend this new service to your consideration. It offers a \$1 ride for 25 cents.

Very truly yours,

J. H. HANNA,
Vice-President.

Introducing the Parlor Car Coaches, Vice-President Hanna Sent Out Some 1,200 Letters to Prospective Passengers Along the Eight-Mile Route

and cards advertising the service and giving the schedule on which the coaches would operate were sent at several later times. A young society girl was employed for a few weeks to send out personal letters to her friends on special stationery. Since the start of the coach service much additional literature has been distributed by the operators.

For about half of the distance between Chevy Chase and downtown Washington the coach line parallels the Chevy Chase electric car route of the Capital Traction and of course for the whole distance parallels it in effect. No apparent reduction in traffic has been noted on the car lines; in fact, there was a slight tendency

upward following the general local trend in this community, so that it appears that the traffic attracted by this de luxe service is new business or at least business the company had years ago and which was lost during the rapid growth in use of the private automobile.

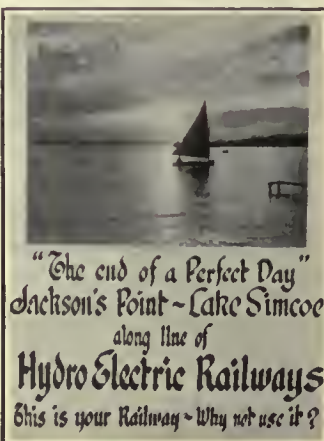
New Magazine Issued by Utility Organization

THE demand for closer contact among the departments of the operating division of the Byllesby Engineering & Management Corporation has been met with the publication of *Byllesby Management*, an executives' magazine. Halford Erickson, vice-president in charge of operation, planned the paper.

The magazine will collect and publish information relating to the operation and management of public utilities, with special reference to those operating under the supervision of the Byllesby Engineering & Management Corporation. The range of topics will be wide, including engineering, construction, financing, sales of service, merchandising of appliances, rate making, valuation, customer ownership and many other subjects in the respective fields of electric, gas and railway operations. Important subjects will be dealt with editorially from the viewpoint of the man inside the organization.

Enlarged Scenic Photographs Make Fine Posters

REAL ingenuity marks the plan used by the Metropolitan Division of the Hydro-Electric Railways of Ontario to advertise pleasant places along its lines. These localities deserve colored posters, but the size of the division would not justify the cost. On the other hand, halftone reproductions on the paper ordinarily used for placards would not do justice to the scene pictured. Therefore the management evolved the plan of making up placards out of enlarged photographs with block letters for text. The ensemble is so attractive that in some cases the stores which help to display the cards are loath to discard them when new subjects come along. The usual edition does not exceed fifty and the cost averages about 50 cents per placard. In addition to the display in stores, these placards are, of course, placed in Hydro stations and cars. Reductions of the same photographs are made for use in the folders that are sent to social organizations in soliciting pleasure traffic both summer and winter.



Centralized Installation of Headway Recorders Saves Time

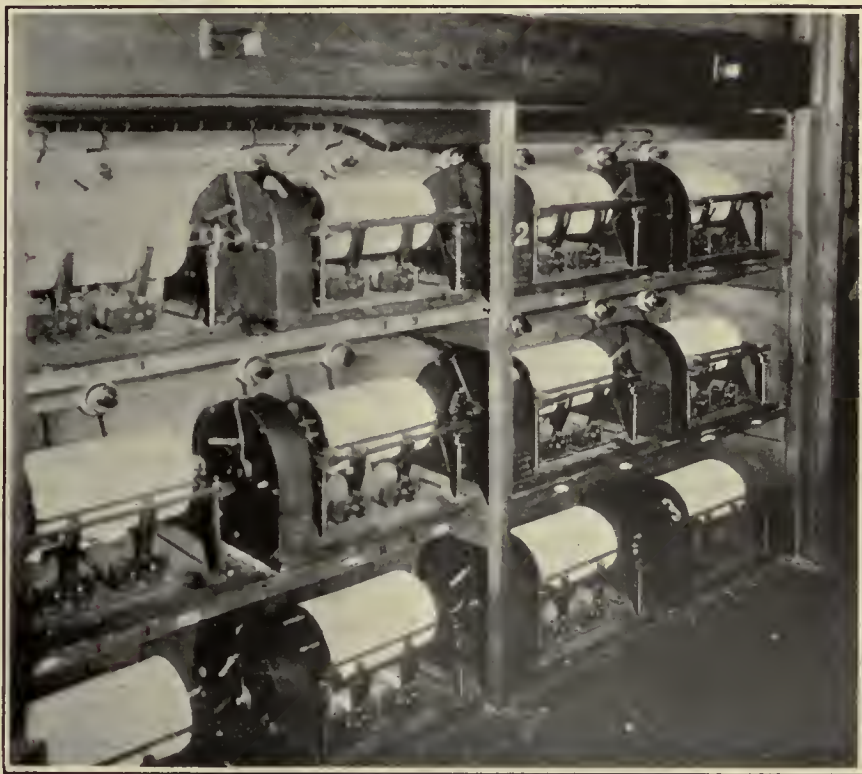
Information Is Obtained More Quickly and the Machines Give a Better Performance Under This Arrangement—Only Inbound Cars Are Checked

EARLY in 1920 the Milwaukee Electric Railway & Light Company installed seven Nachod automatic headway recorders on its local lines in Racine. The results obtained from this installation were considered of sufficient value to warrant a trial in Milwaukee. Accordingly in 1922 recorders were installed on three lines from which a considerable number of complaints in regard to service had been received. Good results were obtained from these installations, but it was found very difficult to keep the clock mechanism properly regulated when being cared for by the line supervisors. On the other hand, to have a man from the general office change the records and care for the clocks entailed a great waste of time in traveling from one location to the other. The idea was then conceived of having the recorder mechanism placed in the main office and connected electrically with the distant contact pan. One instrument was accordingly connected in this manner and gave such excellent results that in 1924 the management approved a plan for covering all 24 lines in Milwaukee with recorders and having the instruments centrally located in the main office. This installation was completed late in 1924 and the recorders have now been in operation for more than a year.

INBOUND CARS ONLY CHECKED

In making this centralized installation it was decided that from the viewpoint of the passenger it was more important to check inbound cars, or those going toward the business section, and of considerably less importance to check outbound cars. Contact pans were accordingly placed over the inbound tracks only and with their centralized arrangement one recorder instrument is made to cover two locations, so that only twelve machines are required to cover the full 24 lines in the city.

The scheme of operation is as follows: The contact pan is placed at a selected point along the line where only cars of that line pass and so located as to avoid as many pull-out or pull-in cars as possible. On the nearest convenient pole is placed a relay, which, receiving the impulse at 600 volts, closes a 52-volt circuit through a telephone cable to the main office, terminating in a telecode relay. This relay closes a 220-volt circuit which operates the recorder. The twelve recorder instruments are placed on shelves in a dustproof cabinet



Battery of Nachod Headway Recorders Assembled in Main Office of the Milwaukee Electric Railway & Light Company

which has a sliding glass front counter-balanced so that it may easily be raised to get to the recorders. The recorder half sheets are numbered consecutively from 1 to 24, corresponding to the 24 locations controlled. Each location is connected through its own snap-switch so that any individual location can be cut out. An accompanying illustration shows the cabinet with the glass door raised.

After trying several different methods of working up the data the one described below was evolved as giving the most and easiest read information for the amount of labor involved. On the first of each month a sheet of millimeter cross-section paper is prepared for each line. This sheet is labeled with the name of the line, month, number and location of recorder pan, all the sheets for any one month being bound at the top in book form. This sheet is divided vertically into two parts, the first half covering from 6 a.m. to 3 p.m. and the second half from 3 p.m. to midnight. In the first column is marked time, each small division representing one minute. In the second column is marked the run number and in the third a horizontal mark indicates the time when that run is scheduled to pass under the recorder pan. The succeeding columns are marked with the dates of the month, Saturdays, Sundays and holi-

Ten-Year Statistics Show Gain in Electric Railway Conditions

In Decade, Electric Railways in Large and Small Cities Have Had Increases in Revenue and Traffic per Inhabitant and Show More Economical Use of Cars

By Albert S. Richey
Electric Railway Engineer, Worcester, Mass.

HAVING had occasion to make comparison of some general operating statistics of the electric railways of the United States in 1914 and in 1924, and to segregate these figures as between the companies serving cities of a population of 500,000 or more and the remainder of the country, it is thought that some of the figures resulting from this study might be of interest to the readers of the ELECTRIC RAILWAY JOURNAL.

The general statistics which apply to the country as a whole are given in Table I. In general, they are similar to those presented by John A. Beeler in the paper on "The Electric Railway Car," which he presented at the Atlantic City convention last October. The figures for population, however, have been revised to exclude that part of the population which the Census Bureau classifies as "rural."

TABLE I—POPULATION, EXCEPT RURAL, IN UNITED STATES. ELECTRIC RAILWAY REVENUE, PASSENGERS AND CARS			
United States	1914	1924	Per Cent Increase
Population (except rural)	57,000,000	67,000,000	18
Operating revenue	\$625,000,000	\$1,027,000,000	64
Revenue passengers	10,250,000,000	13,100,000,000	28
Passenger cars	76,000	77,000	1

In the above table the operating revenue and revenue passengers for 1914 have been determined by interpolation between the 1912 and 1917 figures of the U. S. Census Bureau. The corresponding figures for 1924 were obtained by applying to the Census Bureau figures for 1922 the percentages of change between 1922 and 1924 as shown by the statistics of the American Electric Railway Association. The numbers of passenger cars in use in 1914 and in 1924 were taken directly from Mr. Beeler's paper; it is understood that they were derived partly from the census figures and partly from ELECTRIC RAILWAY JOURNAL data.

GAIN SHOWN IN REVENUE AND PASSENGERS PER INHABITANT

Similar statistics were obtained directly from the electric railways operating in the thirteen cities of the United States which have a population of 500,000 or more. These cities are New York, Chicago, Philadelphia, Boston, Detroit, Cleveland, St. Louis, Baltimore, Los Angeles, Pittsburgh, San Francisco, Buffalo and Milwaukee. By deducting the figures which apply to these thirteen cities from those shown in Table I the statistics shown in Table II were obtained. These apply to the electric railways in the United States outside of the thirteen cities with a population of 500,000 or more.

The increase in revenue passengers shown in Table II, especially for the smaller cities, is some higher than actual comparative figures would warrant, as there was

some zoning in fare limits during the period considered, and passengers who are now paying two fares for a ride which was bought for one fare ten years ago tend to increase the 1924 passenger figures unduly for comparative purposes. This caution applies also to the derived figures shown later, but it is believed that the effect of such zoning as has occurred is not great enough to affect adversely the general conclusions which may be drawn from these figures, especially if this effect be borne in mind.

BOTH SMALL AND LARGE CITIES SHOW INCREASES

It is interesting to note that the railways in the thirteen cities, which serve 28 per cent of the urban population of the country, operate 36 per cent of the cars, carry 53 per cent of the passengers and receive 43 per cent of the total operating revenue. The population of these thirteen cities has increased 22 per cent in ten years, as compared with only 16 per cent increase in the remaining urban population. The number of revenue passengers in the thirteen cities has increased 38 per cent, while in the remainder of the country the increase has been not more than 18 per cent. The operating revenue has increased 76 per cent in the large cities and 57 per cent in the remainder of the country. The larger increases in revenue passengers and operating revenue in the thirteen large cities is accounted for, of course, by the greater amount of necessity riding and the relatively smaller influence of the bus and privately owned automobile. In spite of these latter adverse factors, it is gratifying to note the quite substantial increases in both number of passengers and operating revenue in the country outside of the thirteen large cities.

That the rolling stock equipment is being used much more efficiently at present than ten years ago is indicated by the fact that the largely increased number of revenue passengers is being handled by a decreased number of cars in the larger cities and by a number of cars only slightly increased in the smaller communities.

Based on the figures shown in the three tables pre-

TABLE II—DIVISION OF STATISTICS IN TABLE I BETWEEN DATA FROM THIRTEEN LARGE CITIES AND URBAN POPULATION IN THE UNITED STATES OUTSIDE THOSE CITIES

	1914	1924	Per Cent Increase	1924 Per Cent of Total
Thirteen Cities				
Population	15,450,000	18,800,000	22	28*
Operating revenue	\$251,500,000	\$441,300,000	76	43
Revenue passengers	5,060,000,000	7,000,000,000	38	53
Passenger cars	28,000	27,650	1†	36
U.S. Outside Thirteen Cities				
Population (except rural) ..	41,550,000	48,200,000	16	72*
Operating revenue	\$373,500,000	\$585,700,000	57	57
Revenue passengers	5,190,000,000	6,100,000,000	18	47
Passenger cars	48,000	49,350	3	64

*Per cent of population (except rural) of United States. †Decrease.

sented above, the derived statistics shown in Table III were obtained.

TABLE III—PASSENGERS AND REVENUE PER INHABITANT AND OTHER STATISTICS FOR THIRTEEN SELECTED CITIES AND OTHER URBAN POPULATION

PASSENGERS PER INHABITANT PER ANNUM	1914	1924	PER CENT INCREASE
United States.....	179.8	195.5	9
Thirteen cities.....	327.5	372.3	14
U.S. outside thirteen cities.....	124.9	126.6	1
REVENUE PER INHABITANT PER ANNUM			
United States.....	\$10.96	\$15.33	40
Thirteen cities.....	16.28	23.47	44
U.S. outside thirteen cities.....	8.99	12.15	35
AVERAGE REVENUE PER PASSENGER			
United States.....	Cents 6.10	Cents 7.84	29
Thirteen cities.....	4.97	6.30	27
U.S. outside thirteen cities.....	7.20	9.60	33
PASSENGERS PER CAR PER ANNUM			
United States.....	135,000	170,000	26
Thirteen cities.....	180,700	253,200	40
U. S. outside thirteen cities.....	108,000	123,600	14

It is not surprising to note that the annual number of rides per person is three times as great in the large cities as in the remainder of the country. In the large cities the rate of increase in passengers per inhabitant per annum (14 per cent) is two-thirds as great as the increase in population in the same cities (22 per cent). It will be remembered that before the advent of the automobile it was generally assumed that the passengers per inhabitant would increase at practically the same rate as the population. There is some satisfaction also in the figures showing that the passengers per inhabitant for the United States outside the thirteen large cities has about held its own, indicating that the electric railway is at least as important a factor in the life of this public as it was ten years ago, and that its business has not been reduced seriously by the automobile. Evidently the latter, including both bus and privately owned car, is caring for such increased movement of passengers as has been occasioned by the increase in population.

AVERAGE FARE INCREASED MORE IN SMALLER CITIES

The average revenue per passenger as shown above is obtained by dividing the total operating revenue by the number of revenue passengers. It therefore includes revenue from sources other than passenger fares, such as freight and other miscellaneous revenue, and is still further increased by the inclusion of interurban fares, so that the figures as shown do not represent average fares. The percentages of increase, however, between 1914 and 1924 correspond as closely as might be expected with the increases in fares over that period. The indication is that the average fare has been

increased more in the smaller cities than in the thirteen large ones. Inasmuch as the traffic in the smaller cities is much less dense, and as compared with the larger cities has shown a lesser increase in the ten-year period, the greater relative increase in unit fares was, of course, quite necessary.

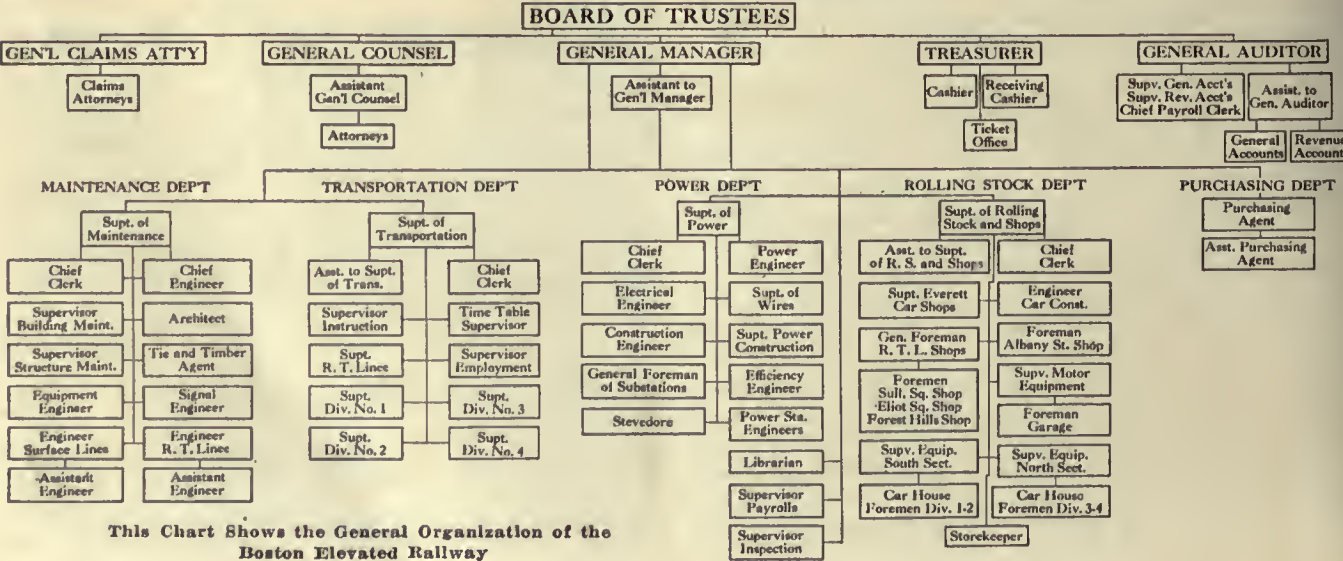
The figures giving the amount of revenue per inhabitant per annum evidently are dependent on the number of rides per inhabitant and the average revenue per ride, and show, as may have been expected from a consideration of the former figures, that the increase is greater in the larger cities than in the smaller. It is interesting to note, however, that even outside of the thirteen large cities the average person was paying about \$9 a year for electric railway transportation in 1914 and more than \$12 at present.

BETTER USE BEING MADE OF ROLLING STOCK

The last of the derived figures shown above indicates a very considerable betterment in the efficiency of the use of rolling stock. Each active passenger car in the thirteen large cities is at present carrying 40 per cent more passengers than it did ten years ago, and even in the smaller communities, despite the much-talked-of destructive competition of the automobile, each car is carrying 14 per cent more passengers than it did ten years ago. This increased efficiency is all the more noticeable since at present there are in use in the country some 6,000 28-ft. one-man cars, all of which are of much smaller passenger carrying capacity than the two-man cars which they replaced.

Departmental Organization of Boston Elevated Railway

FIVE departments, each reporting to the Board of Trustees, constitute the organization of the Boston Elevated Railway. The largest department, of course, is the operating organization under the general manager. This department is again divided into five departments as follows: (1) Maintenance department; (2) transportation department; (3) power department; (4) rolling stock department; (5) purchasing department. In addition, the librarian, the supervisor of payrolls and the supervisor of inspection report directly to the general manager and assistant general manager. The organization chart reproduced was used in one of the lectures in the educational course on the Boston Elevated Railway and a copy appears in the last issue of the company's bulletin.





The Wide Double Stream Doorway Provides Free Movement for Incoming and Outgoing Passengers

More New Cars for Miami

Light in Design but Constructed of Copper-Bearing Steel Plates Because of Climatic Conditions, Fifteen New Cars Embody Many Features Which Make Them Attractive and Comfortable

FORMING the latest addition to the rolling stock of the city of Miami, Fla., fifteen double-end, double-door, one-man single-truck cars were shipped by the J. G. Brill Company recently. The original plan of the city included an appropriation for systematic additions to its transit equipment. The continued increase of electric rolling stock indicates the importance which local officials attach to an efficient transportation system to provide for the rapid development of this Southern city.

The ordinary warm temperature of Florida, while delightful to its inhabitants, has a harmful effect on the usual types of rolling stock. In order to prevent rapid oxidation of the metal the new cars utilize copper-bearing steel plates extensively and all wood has been

treated with preservatives in order to provide for long life and guard against destruction by insects. Bronze screws have been used throughout for fastening the wood members.

A full vision vestibule, which was first employed in the construction of some cars for the Boston Elevated Railway, has been made a feature of the Miami cars. By this means, the operator is given a maximum range of vision through the use of light steel tee-posts. Special attention was paid to the window construction.

In order to try out various methods and finishes in painting, three different systems have been used on the fifteen cars. Ten were finished with the standard enameling system, three have a Duco finish and two are painted with the Miroloid system. The exteriors are green with aluminum lettering and the interiors are finished in mahogany. Pipe railings and stanchions are enameled to match the interior trim.

Ten cross seats of wooden slat construction are provided in the car body and the platforms are provided with the Davis book type seat, which first made its appearance on cars in Brooklyn.



At Left—The Interior Finish Is of Mahogany. Ten Reversible Seats Are of Wood Slat Construction. At Right—A Book Type Folding Seat Provides Additional Seating on the Rear Platform

T. T. C. Operates Supplementary Bus Service

Sightseeing and Feeder Routes Have Been Established
—Modern Equipment Bought—Automobile
Riders Attracted

IN THESE days of rapid developments in matters pertaining to urban transportation attention has been attracted by the progressive program of the Toronto Transportation Commission, Toronto, Ont., which controls for the city practically all public transportation services operated within the city, and also operates, under special agreements, the railway services of adjoining communities.

During the unification, extension, complete rehabilitation and rerouting of the lines which served the city prior to September, 1921, the transportation commission also started bus and trolley-bus routes to serve several residential districts and to operate as feeders to the street cars, with twenty single and double-deck buses and four trolley buses.

These supplementary services, with free transfers issued between buses and street cars, have been continued successfully, with the exception of the trolley bus routes. After a trial extending over three years, the trolley buses were found unsatisfactory and were replaced by an extension of one of the street car routes.

MODERN EQUIPMENT BOUGHT

Alert to the development of the bus, the commission early this year added to its rolling stock a fleet of the most modern and luxurious motor coaches. These include 24 Yellow Coach "Y" type chassis, equipped with pneumatic tires and six-cylinder sleeve-valve engines. Built in the commission's own shops, the bodies are finished in a rich Pyramid gray exterior, while the interior mahogany woodwork, leather upholstered semi-divided seats, beveled mirrors, dome lights and other equipment provide for passengers the luxurious comfort of the finest inclosed private automobile.

The commission's first venture with the coaches was in the sightseeing tour services, for which six of the bodies were especially designed to provide clear view of interesting sights of the city.

During its first months in the sightseeing tour business, the commission had one competitor, the Dominion Coach & Livery Company, which had been operating for a number of years with a fleet of old style, solid-tired buses with bench seats. Acting solely on compassionate motives, the commission bought the assets of its outrival competitor and retired the obsolete buses from sightseeing service. This clarified the local situation and left the sightseeing business to be served exclusively by the commission's modern coaches.

The volume of sightseeing business handled during the first summer of operation was greater by a very pleasing margin than the commission had estimated. A modified schedule of tours is being operated during the winter, and present indications are that visitors appreciate the opportunity to see Toronto's landmarks and beauty spots in their winter settings.

Having supplied the transportation needs of the visiting public, the commission directed its efforts to regain and retain for its public transportation services the traffic that was inclined toward the privately owned automobile.

Early in September, after exhaustive study of various districts that might be served to advantage with motor coaches, the commission started a regularly scheduled motor coach route between the "Hill" residential districts and the downtown business area, passing en route the Provincial Parliament buildings, the large group of buildings of the University of Toronto (with a student registration of more than 5,000) and many apartments and clubs from which traffic for the coaches might be expected to originate.

The "Hill" route coach service is operated on a straight 10-cent fare. No transfers are issued to or from the street car and motor bus routes. The normal headway is five minutes.

AUTOMOBILE RIDERS ATTRACTED

Confirming the commission's estimates, traffic on this route has shown a steady increase each week. Many prominent citizens have taken the trouble to write to the commission to express their appreciation of the service provided by the coach route. Invariably these communications contain the information that the writer and his family had formerly used his automobile for their travels to and from business, shopping, theaters, etc., but the carefree comfort and convenience of the motor coach has resulted in their using the coach service for all these trips.

Incidentally, it is obvious that downtown traffic congestion and parking have been relieved by the absence of many private automobiles which were formerly brought downtown and parked in the congested streets while owners were in offices, stores, theaters, etc.

For the slack periods of traffic on the "Hill" route and sightseeing tours the commission has developed a profitable business by chartering of coaches for special tours, theater parties, lodge visits, excursions and other outings. One organization of women chartered 32 coaches for an excursion from Toronto to Niagara Falls, a round trip of 166 miles.

All motor coach drivers and sightseeing tour lecturers are men carefully selected from the commission's permanent organization and especially instructed in the safe, courteous and efficient performance of their duties. The men are neatly uniformed in dark gray, their smart caps and neat leather leggings giving them an appearance quite in keeping with the splendid appearance of the coaches.

The Toronto Transportation Commission is affiliated with the Association of Gray Line Owners and with its total fleet of 53 motor coaches and buses is the largest operator of automotive public transportation in Canada. Its unique position of exclusive control of public transportation services and its progressive plans to supply the service required are well worthy of attention.

Soft Seats Increase Riding Comfort of London Tramears

CUSHIONED seats are to be fitted on 120 of the Colder type tramcars of the London County Council, London, England. This type seat is known as the pad cushion, and the cost including installation is estimated at £2,580. Up to this time the Council has adhered to the bare wooden slat seat as being the most sanitary and easily kept clean. On account of bus competition, however, the cushioned seats were decided upon to increase riding comfort and attract new passengers.

Light Weight Motor Cars and Trailers for the Berlin Surface Lines

Wheels Are Mounted Directly on Car Body Without Use of a Truck, and Cars Are Equipped with Band or Disk Brakes Which Are Mounted on Armature Shafts of Motor Cars and on Axles of Trail Cars—There Are No Brakeshoes

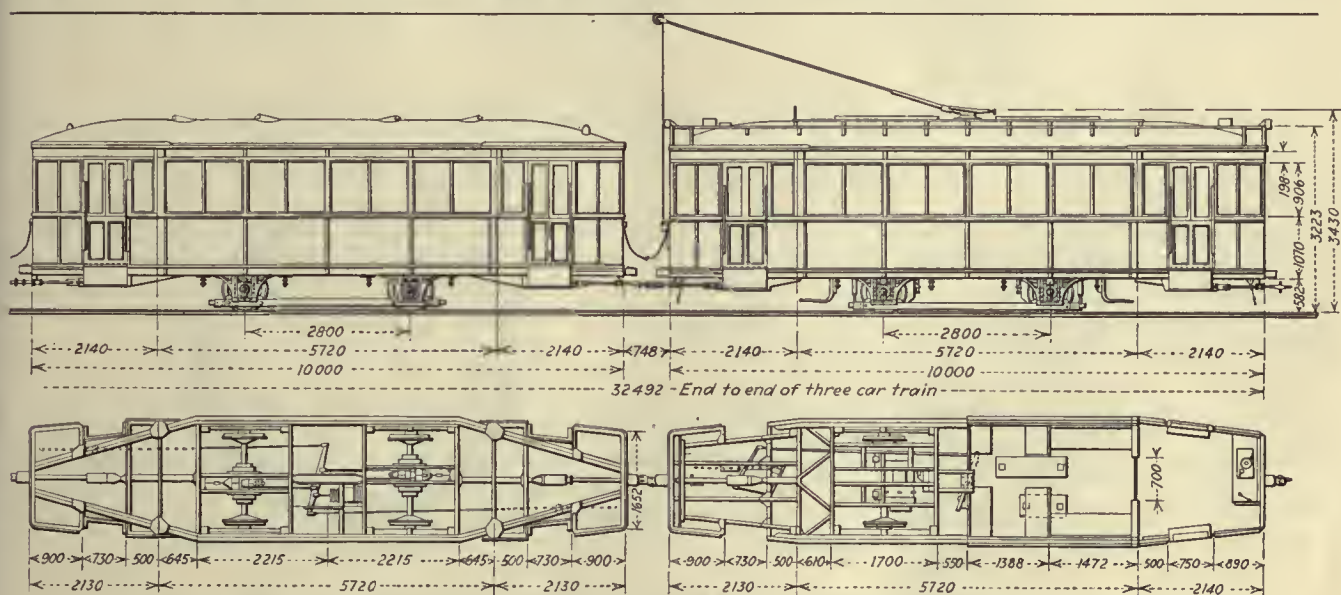
By E. Kindler

Engineer of Equipment Berlin Street Railway System, Berlin, Germany

DURING 1925 the Berlin Street Railway System put in service 500 new motor cars and 500 new trailers. Both types differ radically in outward appearance and in design from those previously used in Berlin. Instead of a monitor roof an arch roof was chosen, by which 600 kg. (1,320 lb.) in weight was saved. Two roof ventilators are used on the motor cars and four on the trailers. These ventilators, with adjustable louvers (1,400 x 140 mm. or 55 x 5.5 in.) over

in front. The car journal boxes are fitted with special projections to which lifting jacks can be readily applied in case of accident.

All structural steel parts for the car framework are of standard shapes and are joined with standard gusset plates so as to make every part readily replaceable. All steel parts were sand-blasted after being cut and immediately thereafter dipped in varnish so as to prevent even the slightest trace of rust.



The Berlin Surface Lines Have Recently Put in Service Three-Car Trains Consisting of a Motor Car and Two Trailers

Only the motor car and one trailer are shown in this plan and elevation. Novel features are the absence of trucks and substitution of disk and band brakes for brakes which operate on the wheels

the side windows, insure a plentiful exchange of air without causing any draft on the occupants of the car.

The exterior of the car has been so finished and painted as to show a streamline effect. This is gained by windows of uniform size and butt joints between side girders and window sashes, and by painting the car body above and below the windows yellow and the side posts white.

The windows are held in brass sash with rubber strips. The glass sash are 4 mm. ($\frac{1}{8}$ in.) thick. On the hood, at each end of each motor car, are two square illuminated markers for showing the route number. Between these markers is the route sign. The same type of route markers used on the motor cars is employed on the trailers as well.

All cars carry the usual wooden guard directly in front of the wheels. In addition, the motor cars also have an automatic fender under the platform with trip

The cars have no separate truck, but the side sills of the car rest directly upon long-leaf springs which rest on the car journal boxes. On the motor car these springs have ten leaves, 1,600 mm. long and 100 mm. wide (63 in. x 4 in.). On the trailer there are ten leaves 1,400 mm. long and 75 mm. wide (55 in. x 3 in.). At each end of these leaf springs are placed small supplementary spiral springs to take up light shocks when the cars are no more than one-quarter occupied. For a larger number of passengers these spiral springs are completely compressed.

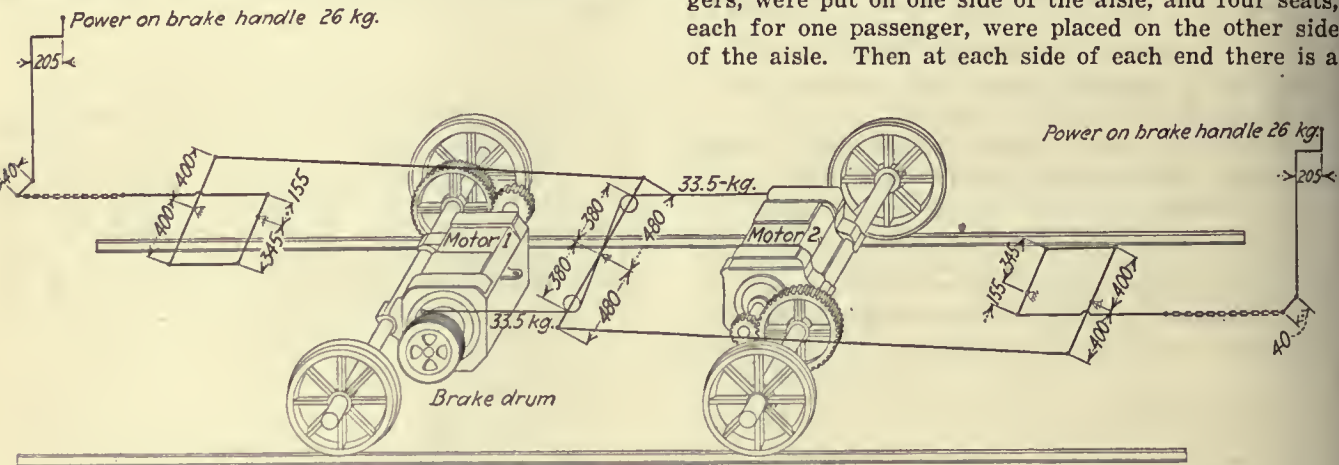
The steel framework of the car is built up on Z-shaped side sills the lower flanges of which point outward and support the four V-shaped corner posts. The upper flange of the Z-shaped side sill is turned to the inside of the car and supports the car floor. On these side sills also are bolted the cast-steel pedestals, in which the journals have a play of 1 mm. (0.04 in.) in each

direction. Through the use of these Z side sills and small high-speed motors, it was possible to keep the floor of the car at the same level as the front and rear platforms and to have both only 770 mm. (30 in.) above the top of the rail.

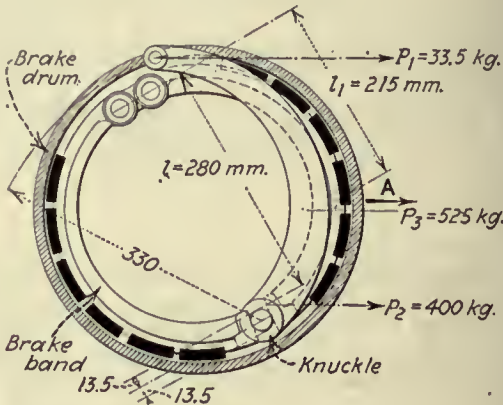
In the trailers a somewhat different form of floor framing is followed. Here the side sills are 10.5 m. (34 ft. 5 in.) long and extend under each platform from buffer to buffer. At their ends under each platform these side girders are bent inward toward the draft rigging, so that the shocks from the coupler are transmitted directly to these girders. On the motor cars the side sills end at the corner posts and the platforms are

oak veneer, which has been fumed for 48 hours in ammonia vapors, and subsequently coated with "mattin" lacquer. In this way the appearance of a steel car has been entirely avoided. As a matter of fact, the brown hue of the fumed oak, the simple white ceiling, the dark red artificial leather covering the steel spring upholstered seats, the paneled car sides and the narrow brass fittings give the interior of the car a very home-like appearance, such as was intended by the designer of the interior, Prof. Bruno Paul.

The over-all width of the car is 2,200 mm. (7 ft. 2½ in.) and the width of the aisle is 553 mm. (21¾ in.). In consequence, four cross-seats, each for two passengers, were put on one side of the aisle, and four seats, each for one passenger, were placed on the other side of the aisle. Then at each side of each end there is a



Weight of car empty.....11,000 kg.
Weight of car loaded.....16,000 kg.
Gear ratio.....1:5.92
Power on the brake handle.....26 kg.
Power on the brake chain..... $26 \times \frac{205}{40} = 132 \text{ kg.}$
Total braking pressure..... $26 \times \frac{205}{40} \times \frac{155}{345} \times \frac{400}{400} \times \frac{480}{380} \times 0.9 = 67 \text{ kg.}$
For one brake drum..... $P_1 = \frac{67}{2} = 33.5 \text{ kg.}$
Pressure of the knuckle on the brake band..... $P_2 = \frac{33.5 \times 320}{33.5 \times 2} = 400 \text{ kg.}$
The power applied in the middle at A on the brake drum
is: $P_3 = P_2 \times \frac{l_1}{l} = 400 \times \frac{215}{280} = 525 \text{ kg.,}$
so that on each brake there is $2 \times 525 = 1,050 \text{ kg.,}$
and for the two brakes.....2,100 kg.
This corresponds to a braking pressure on the wheel perimeter
of..... $P_4 = 2100 \times 5.92 = 12,460 \text{ kg}$
This corresponds to a percentage of braking power
of..78% for a loaded car
This corresponds to a percentage of braking power
of..113% for an empty car



Armature Band Brake on Motor Car with Braking Diagram

carried on four straight U-beams which can readily be replaced if the platform should get damaged. The floor framing of the car is supported on steel channels with liberally dimensioned gusset plates, the thickness of the flooring being 25 mm. (1 in.). The car framing is so designed that the roof, which is stiffened with carlins and is covered with "triolin," can be put in place separately and is independent of the rest of the framework. On account of the frequent sidwiping damage of the Berlin street cars, the side panels had to be made very easily replaceable. These are of 1.5-mm. (¼-in.) sheet steel and are fastened to the side posts with wood screws. They are not used to stiffen the framework of the car. The vestibule hoods are of four-ply and are readily replaceable in case of damage.

INTERIOR DESIGN AND FINISH

Inside of the car, as well as inside of the entrance vestibules, all steel surfaces have been covered with

longitudinal seat to hold three passengers. This gives a seating capacity of 24 passengers per car. The ventilating openings above the windows, already mentioned, are equipped on the inside with frames, which serve as advertising racks. The method of fastening used prevents any bulging out of the printed matter in times of wet weather. A considerable departure from conventional design is represented by the arrangement of the body sash. In these cars the two center sash on each side of the body slide sideways, thus avoiding the need of pockets for drop sash or facilities for permitting them to raise. These movable sash are provided with weather stripping to keep out the drafts in winter. The car is lighted with 25-cp. lamps, mounted on the sideposts above the cross-seats and so dimensioned that reading matter in the hands of a seated passenger will receive about 30 lux luminosity. Shadows of passengers standing in the aisle do not fall upon the paper of the reading passenger.

TABLE SHOWING WEIGHT OF BERLIN CARS IN TEST

Empty motor car (11 tons) + ballast (5½ tons).....	16.5 metric tons or 36,300 lb.
Two empty trailers (7.22 tons each) + ballast (5½ tons each).....	24.94 metric tons or 54,868 lb.
Eight passengers and instruments.....	0.56 metric tons or 1,232 lb.
Total.....	42.00 metric tons or 92,400 lb.

By means of a switch within the car or by another one on the platform an emergency circuit of lamps can be thrown in in case of trouble with the lamps used for regular service.

Heat is supplied by electric heaters placed under the cross-seats and wired so they can receive either current from the overhead line or that generated by the motors when they are used as generators to brake the car. The heaters are designed so that the inside temperature of the car can be raised about 10 deg. C.

Each trailer is similarly equipped with heaters which are supplied with current from the motor car through a jumper cable.

WHEELS, JOURNALS AND BEARINGS

The car wheels have tread diameter of 720 mm. (28½ in.). All axles are made of nickel-manganese steel, containing 1 per cent nickel and 1½ per cent manganese. The wheel tires are of chromium steel and the wheel centers of cast steel.

The car journals are equipped with a double row of S.K.F. roller bearings, filled with a special grease lubricant which is claimed to give satisfactory service for one year without any attendance to the bearing. These bearings can be taken off readily when the wheels have to be taken out of the car when the tires are turned down. The roller races which remain on the journal are then temporarily inclosed to prevent injury.

BAND AND DISK BRAKES

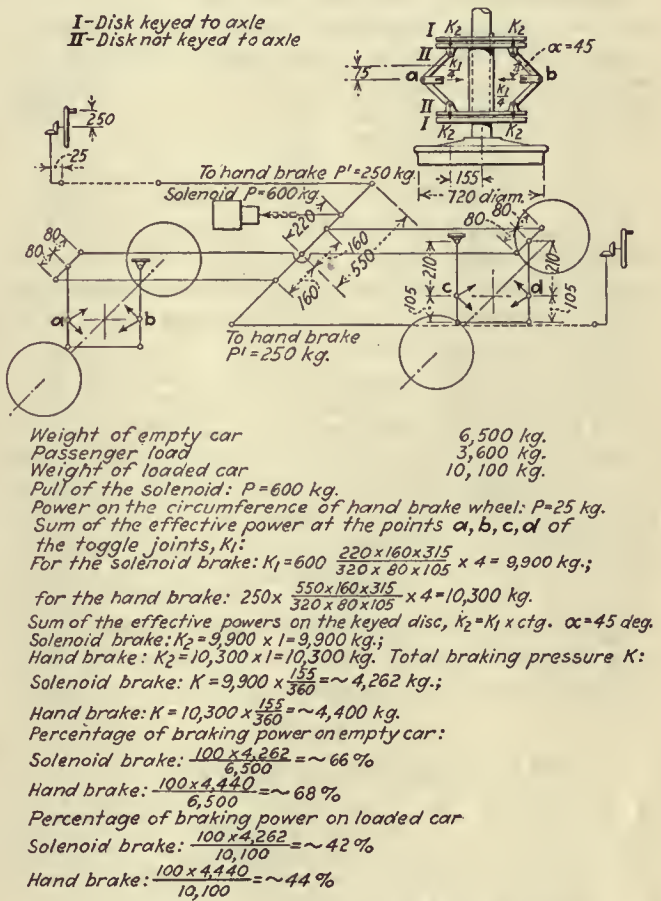
Perhaps the most novel feature is the mechanical brake with which both motor cars and trailers are equipped. This is entirely different from any brake hitherto used in Berlin and was necessary because, with the method of car body support adopted, the brakeshoes would have moved too far away from the wheels on a fully loaded car to function properly. It was therefore decided to design a brake rigging which would be independent of any movement of the wheels.

On the motor car this brake consists of a band operating on a drum attached to the armature shaft of the motor which has been extended on the commutator side to hold this drum. The drum, in turn, has been equipped with an inside band brake not greatly different in design from that used on automobiles. The brake-band lining is made chiefly of asbestos.

On the trailers the mechanical brake takes the form of a double disk brake in which a toggle joint on each axle presses two 10-mm. thick asbestos-lined plates against two circular steel disks with polished surfaces attached to the axle. This brake operates noiselessly and is very elastic, and the asbestos surfaces have been found to have a very long life. These brakes on the trailer are operated from the motor car by a solenoid mounted on the trailer and having a 600-kg. (1,320-lb.) pull and 90-mm. (3½-in.) stroke, or can be operated by hand.

These two brake systems have the great advantage over the commonly used brake that both braking and braked surfaces are away from the zone of street dirt and moisture, so that the friction coefficient is prac-

tically constant. They have the further advantage that they do not involve the use of pressures against one side of the journals and journal bearings and that by a simple arrangement of effective levers a very slight amount of power exerted by the motorman effects a very large braking action. In this way the brakes respond exceedingly quickly. Other advantages are the



Double Disk Brake on Trailer with Braking Diagram

exact brake pressure equalization possible and a great saving in wear of wheel tires.

In addition to the mechanical brake described, the motor car is arranged for electric braking through the use of the motors as generators. When trailers are hauled, a part of the regenerated current from the car motors can be sent through resistances on the trailer or trailers for heating purposes, as already described. If trailers are not being hauled the brake circuit is automatically completed on the motor car.

Five hundred of the electric motors required for these 500 cars were supplied by the A.E.G. and 500 by the Siemens-Schuckert Works. The light-weight motors made by both of these companies are essentially alike, particularly in those parts which are subjected to wear, such as brushes, gears, axle bearings, gear casings and armature brake. This co-operation in design is considered a very essential step toward motor standardization. The motors have an hourly rating of

34 kw. at 500 volts, 70 amp. and 770 r.p.m. Their continuous output is 24.7 kw. at 900 r.p.m. The weight of one motor is 780 kg. (1,716 lb.) alone, and 830 kg. (1,826 lb.) complete with accessories. The armature brake weighs 65 kg. (143 lb.), the armature 175 kg. (385 lb.), and the gear case 25 kg. (55 lb.).

All motors have roller bearings and commutating poles and are self-ventilating. With the introduction of high-speed motors, large savings were made in weight, cost and size. The use of these motors has made it possible to find room under the car for the new type of armature brake and permitted the use of small diameter wheels. The reduced weight of the wheels in turn reduced the upsprung weight on the rails and tends to reduce their maintenance cost.

All the light wires are installed in small wooden ducts above the window ventilators and are very easily accessible. The grounding cables are connected to both motor housings and thence to the axle to prevent the operating or braking current from finding its way across the roller bearings.

TESTS ON SPEED AND CURRENT CONSUMPTION

Tests on speed and current consumption have been made with trains of one motor and two trailers in regular scheduled service. The cars were loaded with ballast equivalent to a full load of passengers as shown in the accompanying table.

The ballast used corresponds to a weight of about 75 passengers per car. The time taken for a run over the 14.679-km. (9.1-mile) long track was 52 minutes, including twelve-second stops at each stopping point. The current consumption was an average of 45 watt-hours per ton-kilometer (64 watt-hours per ton-mile). The moving resistance as measured by "run-out" tests was an average of 6.5 to 7 kg. per metric ton (13 to 14 lb. per ton of 2,000 lb.). The highest speed of the train weighing 42 metric tons was 32 km. (20 miles) per hour on the level, and for the empty motor car alone 41 to 42 km. (25½ to 26 miles) per hour.

Wheeling Wives Win Passes

ADDRESSES by A. C. Spurr, general manager of the Wheeling Traction Company, and Prosecuting Attorney A. C. Schiffler and the acceptance of eleven new members into the Veterans' Association featured the entertainment and dance given recently by the veteran employees of the Wheeling Traction Company, Wheeling, W. Va. The entertainment was one of a series that is staged by members of the Veterans' Association, made up of men in the transportation department who have been in the service of the company for twenty years or more. Following the program dancing was enjoyed by the several hundred couples present until midnight.

In his address Mr. Spurr declared that the transportation business was a partnership with employees, traction officials and the public served. He also spoke highly of the wives of veteran trainmen, to whom he referred as "silent partners," and said that it is his intention to present them with passes on all lines of the Wheeling Traction Company as an expression of appreciation for their efforts. He announced that passes would be mailed on Jan. 1 to the wives of all trainmen who have been in the service of the company for twenty years or more.

Bureau of Public Roads Issues Bus Statistics from Eight States

RECENTLY the United States Bureau of Public Roads, which is a part of the United States Department of Agriculture, made public an analysis of bus operation in eight states. It was compiled by H. R. Trumbower, economist of the bureau, and appears in the official publication of the department, entitled "Public Roads." The data from three of the states, Connecticut, Maryland and New Hampshire, were obtained from the records of the Public Service Com-

FARES CHARGED BY INTERURBAN AND SUBURBAN BUS LINES IN CONNECTICUT, NEW HAMPSHIRE AND MARYLAND

Rate of Fare per Mile (Cents)	Connecticut Routes		New Hampshire Routes		Maryland Routes	
	Num- ber	Per Cent	Num- ber	Per Cent	Num- ber	Per Cent
2 to 3	2	4.2	1	3.1	1	3.1
3 to 4	7	14.9	4	12.5	6	18.8
4 to 5	21	44.7	3	9.4	11	34.4
5 to 6	11	23.4	7	21.9	13	40.6
6 to 7	3	6.4	2	6.3	1	3.1
7 to 8	3	6.4	1	3.1	..	..
8 to 9	..	..	1	3.1	..	..
9 to 10	..	..	4	12.5	..	..
10 to 11	..	..	2	6.3	..	..
12 to 13	..	..	5	15.6	..	..
15 to 16	..	..	1	3.1	..	..
18 to 19	..	..	1	3.1	..	..
Total	47	100.0	32	100.0	32	100.0

missions of those states. For the other states, West Virginia, Kentucky, Arizona, Oregon and Washington, the material was obtained from summaries published by the American Electric Railway Association.

In these eight states there are 705 bus routes, which have a total length of 18,196 miles and an average length of 25.8 miles. Sixteen of these routes are 100 miles or more in length, but more than half of them are less than 20 miles in length. Of this route mileage, 41 per cent was directly competitive with the steam railroads, 28 per cent indirectly competitive and 31 per cent non-competitive. The author declares that motor bus and truck competition had very little or nothing to do with the recently announced policy of the Boston & Maine Railroad to abandon 1,000 miles of track and that this competition has been very limited.

Almost invariably the rates per mile charged by the bus operators are higher than the mileage rates of the competing railroads, indicating, in the opinion of the compiler, that the bus lines must have some

MOTOR BUS LICENSE FEES AND TAXES IN EIGHT STATES

State	Annual License Fee	Gasoline Tax	Total	Personal- Property Tax in Addition
Connecticut	\$82.50	\$71.42	\$153.92	Yes
New Hampshire	276.00	142.84	418.84	Yes
West Virginia	666.67	249.97	916.64	Yes
Kentucky	270.00	214.26	484.26	Yes
Arizona	25.00	177.00	202.00	No data
Oregon	177.00	214.26	391.26	No
Washington	250.00	142.84	392.84	Yes
Maryland	1,428.57	142.84	1,571.41	Yes
Average	\$396.96	\$174.09	\$571.05	.....

superiority in service, such as a more direct route or more frequent service. Examples of both are given. A table of the capacities of the buses being used shows that 35.5 per cent have a capacity of from one to seven passengers, 25.3 a capacity of from eight to fourteen passengers, 34.2 per cent a capacity of from sixteen to 24 passengers and 5 per cent a capacity of 25 passengers or over. Two tables, one showing fares charged in three of the states and the other the motor bus fees and taxes in all eight states, are reproduced.

The Readers' Forum

Manufacturers of Cars Can Be More Aggressive

WHEELING TRACTION COMPANY

WHEELING, W. VA., Feb. 5, 1926.

To the Editor:

You probably have been in a "crossroads" town and noticed the way the windows of the general store are dressed—the glass opaque, the articles antiques, the whole aspect unattractive—and they do business only with those who must trade with them.

In many parts of the country the street railways are still dressing their show windows (their cars) in the crossroads manner.

You have been calling attention to this forcibly and I believe that the street railway business as a whole echoes your point of view. Too many striking illustrations of modernizing have been called to our attention to permit us long to forget the fact that "To the quickest belongs the spoils."

If we were, in the bus game entirely, our situation would be better. The motor vehicle salesman would be calling our attention to the need for new equipment, the possibilities of different types of equipment, new fields for our service, new types of service, and then offer to assist us in financing the venture. They seem to have realized that obsolescence deflects earnings and that modernization makes money.

Perhaps there are reasons for the optimism of the bus manufacturer, but with the possibilities that exist for the street railway business, some optimism should be reflected in its future by retiring the faithful carrier of the early days.

A. C. SPURR,
General Manager.

Great Possibilities for Improving Service Through Noise Reduction

AKRON, OHIO, Feb. 4, 1926.

To the Editor:

In the Jan. 23 issue of ELECTRIC RAILWAY JOURNAL there was a letter by "Master Mechanic" in which he feels that the work of the equipment committee toward improving the noise condition and general comfort of cars is a case of "Love's Labor Lost." It would seem from the tone of this letter that the work of maintaining the equipment and keeping expenses down to the limit had very much reduced his vision. It is a pity for any man running a railroad not to have a broad enough vision to see the possibilities of improving the service and keeping it up to the highest possible standards. It is true with all of us that we do not find the money growing on trees, but if the managements of most properties find that certain expenditures will produce results and profit, these managements usually will authorize the necessary expenditures.

It is true that there was no discussion of the very complete report of the sub-committee on noise reduction at the last A.E.R.E.A. convention, but I do not think that this indicated any lack of interest. This report was the last one to be read and the hour was so late that it was thought advisable not to start any discussion.

PIERRE V. C. SEE,
Chairman Equipment Committee.

An Opportunity for "Master Mechanic"

TERRE HAUTE, INDIANAPOLIS & EASTERN
TRACTION COMPANY

INDIANAPOLIS, IND., Feb. 3, 1926.

To the Editor:

In your issues of Jan. 16, Jan. 23 and Jan. 30 I note some correspondence between the chairman of the committee on noise reduction and "Master Mechanic." I think "Master Mechanic" overlooks the function of various committees of the American Electric Railway Engineering Association. Certainly they are taking into consideration the greatest good for the greatest number and pursue their work along lines which will be of greatest benefit to the individual and the companies, and are not attempting to advise any one way how various properties may increase their revenues.

I believe also "Master Mechanic" overlooks the trend of thought and demand on the part of the public toward more luxury and comfort in the public conveyances which are used on our streets. The tremendous increase in the number of rubber-tired vehicles has more or less instilled the idea in car riders' minds that there is no real necessity for noise. This is the very problem the committee on noise prevention is trying to solve. It will point the way to master mechanics, truck departments and others. Certainly the committee is not attempting to advise in any individual case what should or should not be done, that being up to individuals to determine as the revenues of their properties may indicate. There is no question, however, that the investigation which the committee is pursuing in a practical, not a theoretical way, will tend, in the end, to do the two things regarding which "Master Mechanic" complains; that is, increase his revenue and decrease his maintenance expense. In addition, it will certainly increase the feeling of friendliness toward his company or his patrons, the car riders.

Should the entire membership of the association take the attitude toward the work of the committee which apparently is assumed by "Master Mechanic" there would most certainly be very little accomplished as to constructive progress in the industry. If "Master Mechanic" will make himself known, I, as a member of the executive committee of the A.E.R.E.A. and of many years' experience in committee work, would be glad to use my efforts to have him become a member of some of the committees in order that he might ascertain what is back of all their hard work and investigation. Such membership might be of material benefit to him.

It occurs to the writer that if "Master Mechanic" had not been so prone to the use of "Aladdin's Lamp" instead of putting forth individual effort his property might be in condition to adopt progressive recommendations.

WILLARD F. GRAVES,
Member Executive Committee A.E.R.E.A.

Anti-Glare Glass on Sheffield Cars

SO SUCCESSFUL has been an experiment with anti-glare glass fitted in front of some of the Sheffield, England, trams that it is to be adopted for all the cars in the city. The device consists of a sheet of blue glass fitted on a level with the motorman and a little to the right. Its purpose is to prevent the driver from being dazzled by powerful headlights on approaching vehicles.

Association News & Discussions

Self-Propelled Cars and Locomotives

A. H. Candee Analyzes the Characteristics of Oil-Electric and Gas-Electric Driven Units—Advantages and Disadvantages of This Type of Equipment Stressed—Present Field Is Outlined

DISCUSSIONS by various manufacturers of the pros and cons of gas-electric and oil-electric operation of rail cars and locomotives have occurred quite frequently during the past month. Generally, however, it has not been possible to get a complete picture of the entire field. A broad analysis of the subject was made by A. H. Candee, general engineer of the Westinghouse Electric & Manufacturing Company, in an address before the Iowa Engineering Society at Mason City, Iowa, on Jan. 28. While optimistic for the future of the self-propelled motor car, Mr. Candee does not even suggest that it has approximated its ultimate state of development as yet. He rather shows that the gas-electric and oil-electric rail cars and the oil-electric locomotive have proved particularly efficacious in meeting certain localized conditions in railway operation.

One thing which has been very noticeable in development of the rail cars is the shrinking market for the smaller cars as the larger cars are brought out. Attempts have been made to determine the economical limit in engine size for this type of car, which seems to have been reached for the gasoline engine at about 250 to 275 hp. Larger engines will have some field, but will undoubtedly have to be built on an uneconomical production basis, as the Diesel engine will soon enter the field in the larger capacity.

According to the speaker the difficulties which arise in providing mechanical transmission in gear shifting of the larger gasoline-driven rail cars are no small problem and it has been demonstrated that electrical transmission is the only satisfactory system for the transmission of real power. Its advantages are:

1. Railway motors mounted on the trucks require only cable connections to the car body.
2. Gearing of motors to the axles is simple.
3. Power plant may be located at the most convenient place on the car.
4. Engine speed is independent of the car speed. This means that maximum engine power is available at all times for acceleration and for high-speed running, yet when the power required to maintain a given speed is lower than the maximum the engine speed may be lowered correspondingly. This increases engine life.
5. Simplicity of control.
6. Long life and low maintenance of the transmission as a whole.

For the propulsion of rail vehicles in recent years there has been a rather consistent effort on the part of Diesel engine designers to produce an engine to meet the requirements. The most noteworthy of these is the four-stroke cycle, solid injection engine, built by William Beardmore & Company, Ltd., of Glasgow, Scotland, and of which there are nine in successful operation on rail cars of the Canadian National Railways. This engine compares very favorably in size and weight with the modern gasoline engine and it weighs but 16 lb. per brake horsepower.

In considering the economies of the rail car for light passenger traffic or branch line service, Mr. Candee said, available data indicate that the comparative figures for rail cars using

gasoline engines are from 25 cents to 45 cents, while Diesel engine cars will operate at figures approximately 25 to 35 per cent lower. Time will be required to verify this estimate, although there is every reason to believe that the maintenance of a Diesel engine in railway service should be lower than that of the gasoline engine.

Next the subject of the use of gasoline and Diesel electric engines for locomotives should be taken up. As in the rail car, the weight and space requirements of the Diesel engine have limited its use to sizes where real blocks of power have been required. Gasoline engines have been available for the smaller weights of locomotives and have been used rather extensively in industrial work. In continuous heavy duty, however, the fuel costs have been a severe handicap.

Both gasoline and Diesel engines have recently been used for switching locomotives. The available horsepower per ton on drivers has been much lower than in steam locomotives. These machines are more in the nature of experiments, or rather a step in development of the ultimate. Thus, the Ingersoll-Rand Diesel 60-ton locomotive has 5 hp. per ton and the 100-ton has 6 hp. per ton. The Brill-Westinghouse 75-ton switcher, using 500 hp. in gasoline engines, has 6.66 hp. per ton. Designs are now under way for locomotives having 8 to 14 hp. per ton weight on drivers. An electric locomotive can easily develop 25 to 35 hp. per ton. Steam locomotives can develop from 18 to 23 or 24 hp.

In service the low-power Diesel units with electrical transmission can develop more than enough tractive effort to slip the wheels and thus can haul immense trains, but the speed will be held to a very low value on account of the limited horsepower. To increase the speed it is necessary to reduce the tractive effort on account of the limited power available. Thus the time required to switch a given tonnage is relatively high as compared with steam switching.

One of the big problems of the self-propelled car or locomotive is that of providing power for the auxiliaries, such as radiator fans, air compressors, battery-charging apparatus, and engine starting. Direct connection of fans and compressors to the engine is not often desirable or feasible. With the electrical system of power transmission, electrical energy is available for the auxiliaries, but even then the problems are not all solved. The solution of the problem of varying voltage on the main generators has been solved in the case of the locomotives by the provision of an auxiliary generator having constant voltage characteristics, but with the rail car the use of an additional rotating machine is undesirable.

In concluding, Mr. Candee said, "I do

COMING MEETINGS

OF

Electric Railway and Allied Associations

Feb. 18 — A. S. C. E., A. S. M. E., A. I. E. E. and A. I. M. M. E., joint meeting, Engineering Societies Building, New York, N. Y., 8.15 p.m.

Feb. 24-26 — Electric Railway Association of Equipment Men, Southern Properties, Mobile, Ala.

March 5 — Metropolitan Section, A. E. R. A., 29 West 39th Street, New York, N. Y.

March 8-11 — National Railway Appliance Association, annual exhibition, Coliseum and Annex, Chicago, Ill.

March 9-11 — Oklahoma Utilities Association, annual convention, Mayo Hotel, Tulsa, Okla.

March 12 — Pennsylvania Street Railway Association, annual meeting, William Penn Hotel, Pittsburgh, Pa.

March 17-18 — Illinois Electric Railways Association, Illinois State Electric Association and Illinois Gas Association, annual joint convention, Springfield, Ill.

March 23-25 — National Conference on Street and Highway Safety, Washington, D. C.

April 13-16 — Southwestern Public Service Association, Galveston, Tex.

June 2-4 — Canadian Electric Railway Association, annual convention, Quebec, Canada.

Oct. 4-8 — American Electric Railway Association, annual convention, location not yet determined.

not wish to leave you with the idea that the gasoline or Diesel rail car and the Diesel locomotive are going to supplant the steam locomotive in the immediate future. Undoubtedly the rail car is developed sufficiently at this time to become the economical substitute for the steam locomotive in several classes of service. Locomotives equipped with internal combustion engines, however, have proved their desirability in but one class of service — that of light switching duty. As the ratio of cost between the Diesel locomotive and the steam locomotive is now quite considerable, the railroads will require conclusive demonstrations of the economies of a new form of motive power before they buy in quantities, and it will be many years before the intensively interesting and spectacular steam locomotive vanishes from our sight."

Canadian Convention Goes to Quebec

QUEBEC has been chosen for the 22d annual meeting of the Canadian Electric Railway Association. It

will be held on June 2 to 4, inclusive. As in the last two years, the Canadian Electrical Association will hold its convention at the same time and at the same place.

While the exhibits and the majority of the entertainment features will be in common, the business sessions of the two associations will be entirely separate.

The following convention committees have been appointed:

Exhibits—O. C. Rehffuss, Canadian Car & Foundry Company, Montreal, chairman; C. H. Clancy, Toronto; J. A. Fletcher, Montreal; H. T. Gibbs, Toronto; W. J. Lynch, Quebec; Hugh Millar, Montreal, and C. F. R. Jones, Montreal.

Entertainment—R. B. McDunnough, chief engineer Quebec Railway, Light, Heat & Power Company, chairman; T. O. Burnside, Quebec; W. W. Horwood, Montreal; C. W. McMillan, Quebec; Norman Richards, Montreal, and H. E. Weyman, Levis.

From present indications there will be a fairly large exhibit, particularly of buses.

developed by manufacturers and operators; fourth, promote your own welfare and the welfare of your company, to which you owe your best efforts; fifth, to receive the inspiration of frequent contacts with others in electric railway fraternities, both operators and manufacturers; sixth, to build a sound foundation for your own progress in the industry; seventh, to meet foremen, general foremen, dispatchers, motor instructors, superintendents, vice-presidents, general managers and presidents of other transportation companies.

President J. W. Hulme of the Metropolitan Section and R. F. Carbutt, chairman of the membership committee, are responsible for the leaflet. It was accompanied by a strong letter of appeal for membership.

In the first year of this section's activities 1,000 members were enrolled. This year a bogey has been set for 1,500, and from the enthusiasm exhibited and the quality of the meetings held the bogey should be exceeded.

Individual and Company Membership Increasing

NINE company members and ninety individuals were elected to membership in the American Electric Railway Association at the meeting of the executive committee held at Indianapolis, Jan. 29. The new company members include one operating railway, one associate and seven manufacturers. The names are given below:

Operating Company

Saginaw Transit Company, Saginaw, Mich.

Associate

J. K. Moore, consulting engineer, Chicago, Ill.

Manufacturer Companies

Braender Rubber & Tire Company, Inc., Rutherford, N. J.

Century Rubber Works, Cicero, Ill.

Cummings Car & Coach Company, Chicago, Ill.

Egyptian Lacquer Manufacturing Company, Inc., New York, N. Y.

Elliott-Fisher Company, New York, N. Y.

Selden Truck Corporation, Rochester, N. Y.

Ternstedt Manufacturing Company, Detroit, Mich.

The 90 individual memberships are divided as follows:

	Operating	Associate	Manufacturer	Total
Affiliated with member company:				
Accountants....	4	..	..	4
American.....	14	3	25	42
Claims.....	2	1	..	3
Engineering.....	8	1	9	18
T. & T.....	8	..	2	10
	36	5	36	77
Not affiliated with member companies:				
Accountants....	1	1	..	2
American.....	..	..	2	2
Engineering.....	1	..	4	5
T. & T.....	4	..	..	4
	6	1	6	13

The Truth About Local Transportation

UNDER this title a small eight-page folder has recently been issued by the publication department of the American Electric Railway Association. It contains interesting and helpful facts about the industry written by Mr. Storrs, the managing director of the association.

American Association News

Convention Location Not Decided

WHILE two meetings of sub-committees of the committee on location of the A. E. R. A. were held last month to investigate the possibilities of selecting Cleveland or Atlantic City for the annual convention it was not possible to get the full committee together at Indianapolis on Jan. 29, the date when the meeting was called. Accordingly no final report was made to the executive committee. Chairman C. E. Morgan, who was delayed en route, arrived in Indianapolis in time to make a short oral report, but without a recommendation as to the location of the convention. The statement in the calendar of *Bus Transportation* for February that the convention will be held in Cleveland was in error.

It is planned to hold a meeting of the committee on location during the coming week to take definite action. Since the executive committee finds it impossible to hold a special meeting for the purpose of approving a recommendation, a special committee with Mr. Morgan as chairman was appointed at Indianapolis with power to act. The complete personnel of this committee was published in the report of that meeting in the Feb. 6 issue.

Special Reports Available

SPECIAL reports have been prepared by the Bureau of Information and Service of the American Electric Railway Association and are available to member companies upon request.

Bulletin No. 64—Trend of Electric Railway Operations.—A month by month record of the revenues, expenses, taxes, car-miles, revenue passengers, operating ratio, etc., of a group of 154 companies for the months of January to November, 1925, compared with the same period of 1924. The combined

figures for the group are followed by separate statements for each of the geographical divisions of the country. In addition the month by month record of operations of the group of 80 companies started in January, 1920, and published in bulletin form from time to time has also been brought through the month of November, 1925.

Bulletin No. 65—Motor Bus Legislation in 1925.—Contains complete copies of all motor bus regulatory legislation passed during the year 1925, with a carefully prepared analytical index, permitting easy reference to any section of laws. This bulletin supplements Bulletin No. 17, "State Regulation of Motor Bus Common Carriers," issued April 1, 1925.

Bulletin No. 66—Trend of Trainmen's Wages.—Shows for a large group of companies the maximum wage rate, the number of years of service necessary to reach this maximum and the number of trainmen employed for the years 1914 to 1925 and as of Feb. 1, 1926.

Bulletin No. 67—Electric Railway Fares in 1917 to 1925.—Shows the fares in effect in 319 cities having a population of 25,000 or more, 1917 to Dec. 31, 1925. In addition it shows the average cash rate of fares in 272 cities in these same years and the number of cities in which each rate of fare was in effect in each of the years.

In addition to the above, supplements to the Wage Bulletin, Fare Bulletin and Cost of Living Studies (Bulletin No. 68) have been prepared, bringing them down to date.

Metropolitan Section, A.E.R.A., Issues Attractive Leaflet

IN AN attractive two-fold leaflet, a direct appeal for new members has been issued by the membership committee of the Metropolitan Section to operating men in New York City and vicinity.

"You should belong" is answered by seven reasons: First, to learn how other companies handle their shop, car and street problems; second, to tell others how to solve problems, lending a helping hand, exchanging ideas for the mutual benefit of all; third, to learn of new practices constantly being

Maintenance of Equipment

Chemical Mixture Removes Paint Quickly

BY J. L. BROWN

Master Mechanic Dallas Railway

ECONOMY in removing paint from the exteriors and interiors of cars has been accomplished by the Dallas Railway by means of a special chemical mixture applied hot. Both the mixture itself and the apparatus used in its preparation were perfected by Dr. L. C. Moore, former city chemist of Dallas. Altogether there are four tanks, two above and two below. The bottom tanks are connected to a Pittsburgh heater, as shown in an accompanying illustration. The tanks on the left are used for mixing the paint remover, while those on the right are used in the

preparation of a car-cleaning solution. An air compressor, not shown in the picture, is part of the equipment.

Eighteen pounds of a substance called Mooreite and 60 gal. of water are mixed in the left-hand upper tank and then allowed to flow into the left-hand lower tank. The mixture is forced from the lower tank by air pressure through the coils in the Pittsburgh heater to attain a temperature of about 175 deg. F. A small hose is connected to the outlet of the heater, and on the end of the hose is a small nozzle with a thumb valve. This arrangement permits the operator to handle conveniently the solution to be applied to the painted surface. A small stream is played upon the paint to be removed

until it becomes soft and falls away from the surface. After the paint has been removed the entire surface is given a bath of clear water, which neutralizes the paint remover and prevents rusting of the metal.

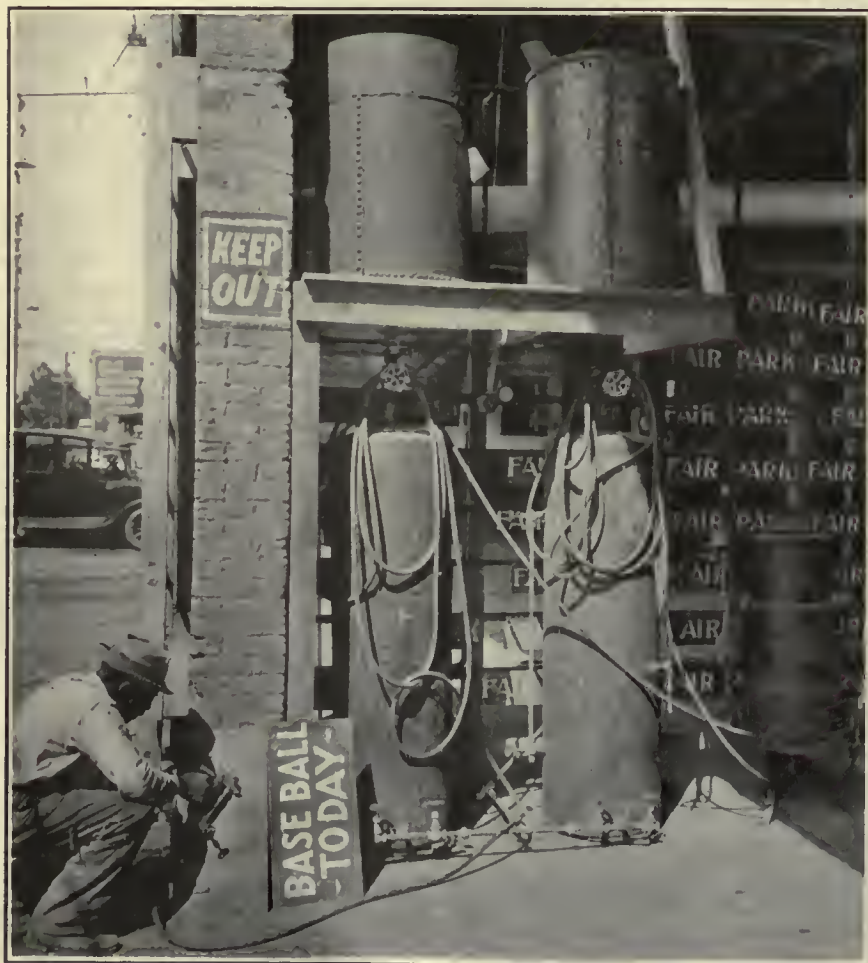
The cost of removing paint from a double-truck car 45 ft. in length which has been painted every two years for the last eighteen years without removing the paint was \$18.24. The cost for this same job using a paint remover for the steel and burning the paint off the wood with a blowtorch was \$33.80. Thus, a saving of \$15.56 was effected. The job included removal of the paint from the body inside and outside as well as from the wood seats.

To renovate and clean a painted surface without injury to the paint 2½ lb. of Westolite is mixed with 60 gal. of water. The same procedure of operation is employed as the paint-removing scheme. The old method of cleaning inside the car with hand brush and soap costs \$2.94, as compared with \$1.35 with the new method.

Manganese Special Work Successfully Welded*

ONE of the major items of track maintenance on the lines of the Denver Tramway, Denver, Col., is the maintenance of special work. This has been reduced materially through the installation of solid cast manganese flange bearing special work, the use of hard center special work, and carbon steel flange bearing work hardened by a special process. The life of manganese special work has been prolonged in many cases through the use of surface welding. This welding has been made a success by chilling the weld very frequently. This is done by the application of water before cooling takes place.

While hard center special work is not considered as satisfactory as solid cast manganese, the company has some installed which requires



Apparatus Used by Dallas Railway for Cleaning and Paint Removing

Solutions are mixed in the upper tanks and allowed to flow into the lower tanks. From there they are forced by air pressure through the heater and then through the hose and nozzle.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

maintaining. This work consists of melting the old metal or babbitt with an acetylene torch with special scraper. Air from a portable air compressor is used for cleaning the center and the opening. An air pressure of 120 lb. per square inch is used to blow out foreign material. The center is removed and cleaned thoroughly and the pocket is dried by heating with a gasoline torch to prevent an explosion from steam formation while pouring in the new metal. In replacing the center, it is adjusted to the proper level by thin metal shims which are left in place. Antimonial lead has been found to give best results for resetting the centers on account of its characteristic of expanding as it solidifies and thus holding the center under pressure. A special sheet steel portable stove is used to melt the babbitt.

Journal Box Covers Clamped in Position

CLAMPS for holding journal box covers in the proper position are used in truck maintenance work by the Union Street Railway, New Bedford, Mass. Formerly the journal box covers often became loose and were sometimes lost. To overcome this difficulty, G. H. Bonner, shop foreman, devised a method to lock these covers securely in their proper places. It consists of a piece of $\frac{3}{8}$ -in. steel that is bent U-shaped and placed over the outside center of the journal box cover. This U-shaped piece is held in position by a $\frac{1}{2}$ -in. through bolt which passes from side to side through the



Strap Clamp Used by Union Street Railway to Hold Journal Box Covers in Place

journal box. Lock nuts hold this clamp firmly in position. Not only has this simple device eliminated lost journal box covers but it has held them so firmly in place that little dirt has found its way into the journal box and little oil has leaked out of the packings.

New Equipment Available

Novelties Incorporated in Design of Bus Bodies

SEVERAL new features have been incorporated in the design of bus bodies recently built by the Lang Body Company. These will be mounted on International Harvester chassis and will be used in Florida. Particular attention has been paid to details affecting the width.

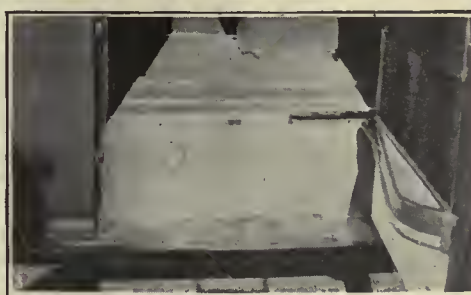
As anything which overhangs or projects from the side of the bus body adds to the effective width, the

Lang company has designed a door handle which springs back flush with the side of the bus when not in use. When the handle is used it is raised and turned in the ordinary manner, but when released it immediately springs back close to the body. This handle is shown in one of the accompanying illustrations.

A grab handle has been placed conveniently alongside the entrance door, as shown in another of the accompanying illustrations. Its presence is a convenience for boarding and alighting passengers, and its location inside the body removes any temptation for the passenger to try to hold on while the bus is in motion. Placing the handle inside also tends to keep down the width.

An intermediate step between the ground and the floor of the bus is arranged in a well. This well is deeply rounded, allowing plenty of space for the step. A step light has been placed at one side and is operated automatically. The entrance door is made airtight by the use of rubber hose. This acts as a yielding washer when the door is shut.

Another new feature of this design is a wind deflector, which has been developed as the result of an idea secured from a bus driver. This driver was in the habit of sticking a piece of cardboard about 4 or 5 in. wide in the crack of the door at his left, bending the cardboard to such a position that when the wind blew in through the open front window it hit the cardboard and was deflected toward him. In warm weather this was a great relief. The wind deflector which has been installed on



Novel Features Incorporated in Recently Built Lang Bus Bodies

1. Conveniently located grab handle is mounted beside the entrance door.
2. Folding handle which springs back against the side of the bus to reduce the over-all width.

3. Rounded step well and rubber hose, which makes the door airtight.
4. Air deflector which throws the wind on to or off the bus driver.

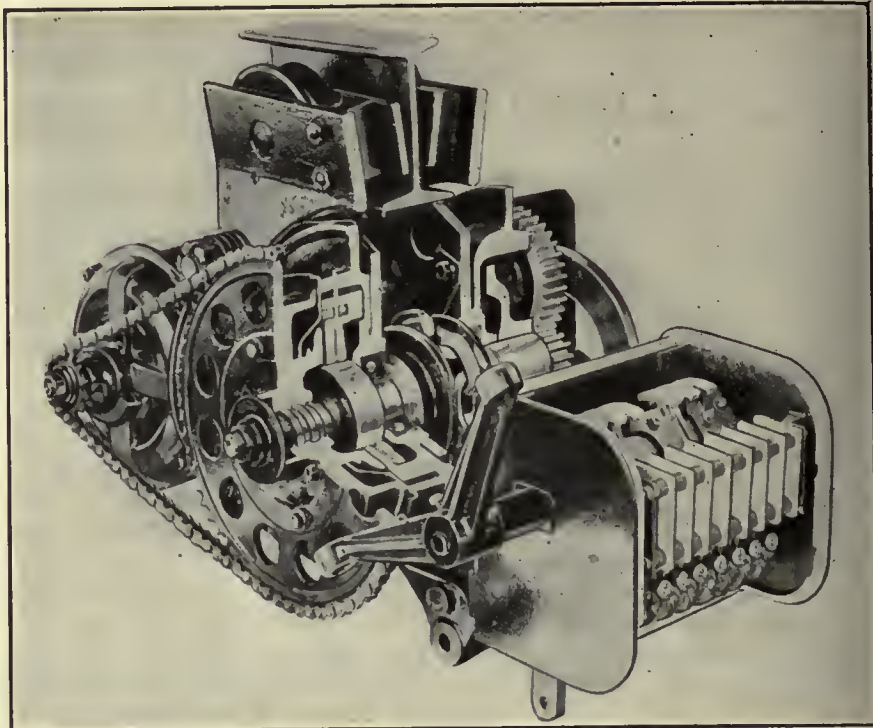
this body is of heavy plate glass, securely set in a polished nickel frame. The frame is attached to the side of the body at the driver's left, as shown in an accompanying illustration. It swings to any angle right or left, so that the driver may adjust it to derive the full effects of the breeze coming in at the front of the vehicle.

Ball Bearing Chain Hoist

LARGE chrome-vanadium steel ball bearings surrounding a massive steel load sheave reduce friction and give increased life to the Yale Model 20 B electric chain hoist just placed on the market by the Yale & Towne Manufacturing Company, Stamford, Conn. The heavy steel one-piece load sheave is ground on an arbor to give perfect concentricity for the ball races. It is bronze bushed for the driving pinion and is provided with splash lubrication to give a continuous flow of oil over the gears, pinions and bearings.

The driving pinion that passes through the load sheave is machined from a single drop forging, then heat-treated. The motor brake mechanism is provided with a large braking area, combined with heavy springs and strong supports to prevent over-travel in hoisting or lowering. The brake is operated positively by the controller handle. When the current is on the brake arms are lifted clear of the drum, so that there is no dragging or friction during the hoisting operation. When current is shut off the brake arms clamp tightly around the hoisting drum and produce a powerful braking action.

The load brake consists of a combination roller ratchet and the Yale-Weston friction disk mechanism. The roller ratchet resembles a huge roller bearing. The inner steel ratchet wheel is hardened and ground and carries six hardened and ground steel rollers, surrounded by an outer hardened and ground steel race. The load is held by the advancement of the steel rollers along the inclined wedge-shaped spaces. Small steel plungers force the rollers into a locking position the moment the hoist comes to rest. As these rollers are applied simultaneously around the entire circumference of the wheel they prevent any backward slipping of the load. The entire mechanism is continuously lubricated within an inclosed compartment.



Yale Model 20 B Ball Bearing Electric Chain Hoist

The design of the central steel suspension frame provides for rapid and easy change from trolley type to hook type hoist. The steel tie plates of the trolley are secured to the hoist suspension plates by two through bolts. These trolley side plates can be adjusted to fit I-beams of various sizes. When the hook type hoist is desired the trolley bolts and plates are removed and the hook and crosshead secured in central slots without the necessity of disassembling the hoist. When rigid suspension is desired both hook and trolley can be omitted and the suspension plate holes utilized in various ways for attachment to overhead construction.

A balance drive planetary transmission is furnished. With this type of gear system the tendency to thrust and wear the bearings apart is neutralized by the counteracting pressure due to the mesh of the intermediate gears with the internal gear. The gear housing is designed to provide a satisfactory splash oiling system.

Upper and lower limit safety stops are provided. These are mechanically connected with the controller and operate the drum brake when the load hook has traveled its limit in either direction. The current is cut off and the brakes are applied the moment the limit of travel is reached. The upper limit stop does not in itself provide maximum

safety of operation, but when combined with the lower limit stop the protection is complete.

Malleable Iron Galvanized Without Embrittlement

OHIO BRASS COMPANY, Mansfield, Ohio, has developed a new metal which it has called "Flecto" iron. This is a type of malleable iron which, by virtue of a heat-treating process, is said to be freed from all tendency toward embrittlement when hot-dip galvanized. While retaining all of the desirable characteristics of malleable iron, the Flecto process so improves the metal with added valuable properties that it is considered to be practically a new metal. All malleable iron castings produced by this manufacturer during the past two years have been treated by this process.

Hot-dip galvanizing has long since been recognized as the best method of rust-proofing castings. However, ordinary malleable castings are frequently embrittled by galvanizing, and as a result, many substitute methods of rust proofing have been resorted to. Experience, however, has shown the great desirability of hot-dip galvanizing if the bad effect upon the iron can be overcome. This is said to have been accomplished in this new iron, whose main characteristic is that it always retains its malleable properties.

The News of the Industry

New One-Man Cars for Milwaukee Demonstrated

Realizing that practical demonstrations are more potent than words, the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., recently invited officers, merchants and the Councilman representing the territory to be served by one-man cars on the Walnut Street line to attend a demonstration trip, under typical operating conditions. The first of a number of new one-man cars which are to be introduced on this line were run on the trial under the direction of railway heads of the company. As a result one-man cars probably will be placed in service for six months, after which the case before the Railroad Commission in which opposition was raised to the use of the cars may be reopened.

The company plans to install 22 of the new one-man cars on this line, where seventeen are now operated. The adoption of a new shade of color embodying a deep shade of orange with ivory trimming will make it possible easily to distinguish them from the two-man cars, painted yellow. The cars will be equipped with suède seats instead of cane seats.

In explaining the extension of the use of the one-man car at the hearing in Milwaukee on Feb. 4, President S. B. Way declared that only through the economy afforded by one-man car operation can the present standard of service be maintained and that 300,000 fewer passengers were carried on the Walnut Street line in 1925 than in 1924. The purpose of the company was to disprove the city's contention that growth of the district served does not necessarily mean increased patronage and business for the company. In spite of increase in population railway earnings in Milwaukee during 1925 were \$100,000 less than in 1924.

At the close of the hearing the commission announced that it reserved decision on the question of reopening the case.

Greater Differential in Fares Sought in Louisville

The Louisville Railway, Louisville, Ky., which on Feb. 1 put into effect a straight 7-cent fare, instead of a 7-cent cash fare with a 6-cent ticket fare, is now asking a cash fare of 10 cents, with tickets at fifteen for \$1, or slightly under 7 cents, for a trial period of two years. It is contended that Louisville's rapid growth demands extensions of service which cannot be taken care of without an income sufficient to enable the company to market securities with which to secure funds for improvement of service. The new industrial district along the riverfront in the western sec-

tion of the city has no street car connections and no prospects, unless funds can be secured to take care of the necessary installations. In the last few years there has been a rapid growth of the city toward the southeastern section, or Highlands, which has only one car line, while there is also need of new lines in the eastern section.

A tentative memorandum has been presented to the city by Churchill Humphrey, counsel for the company, and tentative ordinance terms have been given to the press by Mr. Humphrey and President Barnes, with the consent of the Mayor. The plan is to abrogate the old ordinance and create a new one,

if the Council should favor the proposal.

A census completed in December by officials of the federal bureau showed a 77,000 gain in Louisville for five years, bringing the total up to more than 305,000 inhabitants, with great gains in the suburbs.

It is urged that the variance between cash and ticket fares is in favor of regular riders, who will profit by a low fare, whereas the transient and casual patrons would pay more. The working man or woman would pay less than at present, but those who contribute to the company's income only in an emergency would be penalized under the new proposal.

Franchise Question in Kansas City, Kan.

Pledges Sought from Reorganized Company Regarding Proposed Railway and Bus Services—Adequate and Better Service Promised to City Commissioners

PRESIDENT NESSELRODE of the Kansas City (Kan.) Chamber of Commerce in the first week of February appointed a committee to keep in touch with matters pertaining to the proposed franchise for the Kansas City Public Service Company, which bought the properties of the Kansas City Railways at foreclosure early last month. If the sale is approved, the new company will succeed the Kansas City Railways in the operation of the property.

The committee has recommended that the application for a franchise to operate street cars and buses in Kansas City, Kan., should be heard by city officials before a separate franchise for the operation of an independent bus system is awarded to private interests. The committee has further indorsed Frank J. Ryan, Secretary of State, in holding that the Kansas City Public Service Company should make known its intentions for the improvement of transportation facilities in this city before a state charter is granted to the company.

The services of the committee have been offered to Mayor Gordon and to William G. Woolfolk of the service company. It is stated that the committee is interested only in procuring for the city service to which its residents are believed to be entitled.

Although the sale of the railway property has not yet been approved by Judge Kimbrough Stone, referee, the Kansas City Public Service Company applied some time ago for a charter to operate in the state of Kansas. The company was refused a charter by the board on Jan. 21, on the grounds that the company had failed to specify the sort of service Kansas City, Kan., would be given. At the time of the hearing, officials of that city appeared before the board in Topeka and fought the

issuance of such a charter. A hearing has been called for Feb. 17 at Topeka, when a new application for a charter will be considered.

Confirmation of the sale at auction of the Kansas City Railways by Judge Stone is expected some time in March. If and when the sale has been approved by Judge Stone, the control of the properties will immediately pass from the present receivers to the Kansas City Public Service Company, which represents the first mortgage bond holders of the old company organized to bid in the property at foreclosure.

Under the receivership, the railways company has been operating without a franchise in Kansas City, Kan., but it was explained that, were a private company to operate under similar circumstances, every member of that company would be liable for damages resulting from accident and other suits.

During the meeting at Kansas City, Kan., on Feb. 5, it is understood that Mr. Woolfolk gave Mr. Ryan and the city commissioners no definite promise as to the sort of service that city may expect in the event the sale of the properties is approved.

He is said, however, to have stated that service on the whole will be quite adequate and better than that rendered in the past.

Mr. Woolfolk expressed the probability, if a charter is granted, that the new company will place two bus lines in operation on the Kansas side. One line is tentatively planned to run from City Park and the other from State Avenue, both from Kansas City, Kan., to Kansas City, Mo. It was also promised tentatively by Woolfolk that service over the Twelfth Street viaduct, between Kansas City, Mo., and the Argentine district of Kansas City, Kan., would be resumed.

Street cars can reach the Argentine district only over that viaduct. The railway now operates a bus line over the Goddard Avenue viaduct, but passengers who do not wish to pay a 10-cent fare are forced to walk across the bridge to the other side, where they must board another street car and must transfer a second time in order to reach the business district of Kansas City, Kan.

C. D. Darnall, water and light commissioner, told Mr. Woolfolk that bus lines are not desired by residents of the Argentine district. Mr. Woolfolk promised to make a personal study of the situation in that district at an early date.

TALK OF COMPETITIVE BUSES

W. D. Pratt, local financier, a few months ago offered to establish a bus system in Kansas City, Kan., and submitted a tentative list of lines to be operated to the city commissioners, requesting a franchise. He did not ask that street cars be excluded from that city. The commissioners have delayed any definite action on his proposal until a final decision is reached by the Kansas charter board in connection with the charter for the Kansas City Public Service Company.

Apparently no agreement was reached during this latest meeting and, after setting the date for the later hearing in Topeka, Mr. Ryan returned to the capital soon after the close of the meeting.

Contract for Mozart Hill Line in Wheeling

Prospects of having the Wheeling Traction Company, Wheeling, W. Va., assume charge of the Mozart Hill line, a subsidiary of the Wheeling Public Service Company, loomed when the City Council of Wheeling adopted on Feb. 3 a contract to be presented to officials of the traction company. The contract as drafted makes many concessions as to the present franchise of the Wheeling Traction Company. The various franchises will be consolidated and unified if the contract is found favorable.

The proposition is that the Mozart Park Traction Company will be formed to serve in the capacity of a subsidiary. In exchange, the city of Wheeling, which has been operating the line since it was abandoned several months ago, will turn over all equipment for the consideration of \$1. The Mozart Park company will be permitted to operate the line for a period of 75 days, and in that time, if it is found that the operation is unprofitable, the line may be again turned back to the city. The same fare as is in effect at present will be compulsory and the street cars will run between Twelfth Street and Mozart Hill, as was formerly the custom when the system was in charge of the Wheeling Public Service Company. The line will also come under the jurisdiction of the State Public Service Commission.

In connection with the operation of what was formerly a part of the City Railway system, City Manager Harvey L. Kirk in a monthly report to Council announced that during the past two months net earnings by the road had been \$1,140.

City Approves Seven-Cent Cash Fare for Dallas

Increased fares for the Dallas Railway, recommended to the Council by J. W. Everman, supervisor of public utilities for the city, have been approved by the City Commission. It is his idea that the cash fare should be 7 cents with five tickets for 30 cents, with half fare and half tickets for children and school students and free universal transfer. As Mr. Everman sees it, this plan will not work hardship upon the regular riders, citizens of Dallas, as, by purchase of tickets or tokens, they will ride at the same rate as now in effect. Up to Feb. 6 the railway had not indicated its intention regarding the matter, but it was believed the company would accept the proposal. Mr. Everman says:

The 7-cent cash fare will bring increased earnings from those car riders who, of their own choice, pay the cash fare rather than purchase tickets. The 6-cent ticket fare, purchased in lots of five tickets for 30 cents, will not add to the living costs of the Dallas citizens and will be an encouragement to regular riders to purchase the tickets, thereby benefiting the company in the way of cash advanced ahead of service, more rapid movement of street cars (inasmuch as the majority of passengers will be provided with tokens or tickets), saving time making change, etc.

Mr. Everman says that for the increased fare and other considerations the Dallas Railway should be required to secure and expend new money to the amount of \$1,000,000, and also to expend from the reserves for replacements the sum of about \$450,000.

Mr. Everman says the Dallas Railway should agree to place an order immediately for 30 Peter Witt cars. He also says that the company, upon its acceptance of the terms and conditions of the plan, should exercise diligence in carrying out the work, promptly authorizing the City Commission to instruct paving contractors to proceed with the work of paving streets which have been, or are to be, ordered paved, as set forth in the plan, the expense of which pavement is to be partly paid by the Dallas Railway. He wants all orders for all material required for extensions placed promptly.

Mr. Everman said:

In my negotiations with the Dallas Railway the officers have expressed their desire, both now and for the future, to co-operate with your honorable body in every possible way leading up to the furnishing of a first-class transportation service for the city of Dallas, and to this end to furnish \$1,000,000 new money and approximately \$450,000 from reserves and to extend same to improve the property as outlined in this plan, pushing the work with all dispatch consistent with economical business methods, completing the entire plan promptly so as to give the Dallas car riders the improved service with as little delay as possible, and further to work in close harmony with the City Commission to take care of the future street car needs.

He wants this plan with the increased fare made effective immediately.

\$55,000,000 Construction Budget in New Jersey

Approval of the 1926 construction budgets of public service operating companies, including Public Service Electric & Gas Company, Public Service Railway and Public Service Transportation Company, brings the total amount now authorized to be expended on the improvement of electric, gas and trans-

portation facilities in the territory served by these utilities up to approximately \$55,000,000. New authorizations for 1926 total more than \$18,000,000. Construction projects already approved and to which the companies are committed make up the rest.

The completion of the great Kearny electric generation station and the Harrison gas works are the biggest single items in the program of the Electric & Gas Company, while for the railway, an order for 333 gas-electric buses, said to be the largest single order for buses ever placed at one time, heads the list.

More than half of the construction budget of the railway will be used for track reconstruction. In addition to the 333 gas-electric buses, previously provided for, the company appropriations cover new garage facilities at Camden, Hackensack and Elizabeth.

Electrification of Railroads Must Go On

Samuel Insull, president of the Commonwealth Edison Company, Chicago, in addressing the Boston Chamber of Commerce, said:

One branch of electrification must go on—that is, the electrification of the steam railroads. Only about 1 per cent of the steam railroads of the United States are electrified today. Of the 250,000 miles of steam railroad, I do not think there are more than 2,500 miles electrified. Steam railroads consume somewhere between 150,000,000 tons and 180,000,000 tons of coal a year in their operations. The figures of what they would require if electrified are so small and the saving is so great that I almost hesitate to quote them. These savings vary from about 100,000,000 tons of coal a year to 140,000,000 tons of coal a year, depending somewhat upon the conservatism of the statistician who does the figuring.

I do not mean to suggest for one moment that all the 250,000 miles of railroads in the United States can be electrified, but certainly, where there is great density of population, great density of manufacturing, and consequently great density of tonnage, they should be electrified. From the experience of electrification of the New Haven road, there should not be a steam locomotive running between Boston and New York today.

F. I. Fuller Praised by Portland Papers

Franklin Ide Fuller, first vice-president of the Portland Electric Power Company, Portland, Ore., who died on Dec. 16, was a real, constructive force in the affairs of that city. Account of this fact was taken by the Portland papers, particularly the *Portland Telegram*. That paper said editorially:

To the moral and physical growth of Portland, F. I. Fuller contributed his share. Coming here about the time Portland was discarding swaddling clothes, he grew up with the city and from the year of his arrival took an active part in its growth. Modest and unassuming in his personal and public actions, Mr. Fuller never attracted the attention many of lesser worth received, but no man with a record of 40 years of clean, upright living in a community, where tangible evidence of his moral and physical accomplishments is ever present, can entirely hide his light under a bushel.

For this reason his passing will be mourned and regretted, not only by those who worked with him in the building of the young commonwealth, but by thousands who now and in years to come will enjoy the benefits of a better Portland which Mr. Fuller helped to make.

As noted in the *ELECTRIC RAILWAY JOURNAL* for Dec. 19, he had been identified with the Portland Company and its predecessors since 1892.

8-Mile Road in 16,000 Town Attracts Attention

The right kind of spirit, co-operation and good fellowship was manifested recently, said the *Berlin Reporter*, Berlin, N. H., of Jan. 21 when the management of the Berlin Street Railway gave a banquet to its employees at Georges.

The interior of the room was decorated to suit the occasion, namely, to represent a street car. As one approached this room or car he was confronted with a metal blue sign that said "Car stops here," and near at hand was another, "Parking 30 minutes only." Inside was a regular carfare register, and bells completely installed, together with other street car signs, made it look like a real street car and was very appropriate. The people inside did not show much respect for the "No smoking" signs, but thought the refreshments were very satisfactory.

After the train order was run through and the fuel and ballast were put away and the headlights were shining brightly the men expressed their appreciation for the kindness shown them by the Berlin Street Railway.

Later a reporter visited the manager. He stated that the Berlin Street Railway feels that it is most fortunate in the high type of men in its service, in their devotion to public service and in the good relations that exist between the management and men.

The company is a strong believer in the principle that the public is reasonable, and even generous, when it is truly acquainted with the conditions and problems of the street railway.

The *Reporter* said:

We wish to congratulate the officers of the Berlin Street Railway in their get-together banquet. This is a very good policy and leads to good results. A few years ago complaints in regard to the Berlin Street Railway were numerous, both in this newspaper and on the street. With their record of service as given to the public at the present time, they should be receiving at least 25 compliments to one of an adverse nature.

Jacksonville Votes on Railway Issue April 13

Voters of Jacksonville, Fla., will decide on April 13 whether they desire to own the Jacksonville Traction Company. This date was set by the City Council on Jan. 11 for the special election at which a \$4,000,000 improvement program will be submitted to the people for approval. The election will determine whether the city shall acquire the railway by purchase. No mention will be made on the ballot of the price to be paid by the city.

Situation in Shreveport Acute

The Shreveport Railways, Shreveport, La., continues to face a crisis of inadequate revenues on account of a low rate of fare. The rate for adults is less than 6 cents. The company has asked the Public Service Commission for permission to increase its fares slightly to net sufficient to cover operating expenses and leave a small margin of profit. This petition is now

pending. In addition to that precarious position, a jitney ordinance adopted by the City Council of Shreveport has resulted in only diminishing the number of jitneys. The Shreveport Railways system last year carried more than 11,000,000 passengers, counting adult fares, school children and transfers.

Chautauqua Institution Refuses to Finance Line

The executive board of Chautauqua Institution, at a meeting at Albany on Jan. 30, expressed the opinion that the institution would not be warranted in investing its funds in aid of the Chautauqua Traction Company with a view to continued operation of the line beyond the 60-day period arranged by the school authorities. The executive board approved the action of officers in agreeing that Chautauqua Institution pay to the school board of the Chautauqua school district No. 3 one-half of such deficit as may arise in the emergency and modified operation of the trolley line, in accordance with the guarantee agreement of the school board with the Chautauqua Traction Company, provided this sum does not exceed \$1,500 over the 60-day period from Jan. 11, 1926. The officers of the institution and the trustees did not anticipate that the abandonment of the railway would have a serious effect upon the attendance at the institution or upon the convenience of its summer patrons. The institution stated that arrangements would be completed as soon as possible for readjusting the passenger, baggage and freight facilities for the changed conditions. The agreement to continue the line for 60 days has been referred to previously.

Would Make Tax Value Basis for Rates

A bill in relation to fixing rates, fares and charges to be exacted by public utility corporations has been introduced in the Senate and Assembly by Minority Leaders Downing and Bloch.

The bill adds a new section, 24-A, to the public service commission law and provides that the commission shall consider the assessed valuation of the properties of the company upon which their income, franchise, corporation and other taxes are based as such information is filed with the State Tax Commission in fixing any rate, fare or charge. It also provides that the commission may go back to all decisions rendered since Jan. 1, 1921, and reopen the same, and may give consideration to the assessed valuation of the properties of the corporations. The Tax Commission is required under the provisions of the bill to furnish all information in its possession to the commission, such information now being confidential and not available to the rate-making body.

News Notes

Rehearing on Track Work Denied.—The Public Service Commission denied on Feb. 8 the petition of the International Railway, Buffalo, N. Y., for a rehearing on its recent order directing certain track reconstruction work to be done in Buffalo.

Hearing Set on Utica Increase.—A hearing will be held before Chairman William A. Prendergast of the Public Service Commission at Albany on Feb. 17 on the petition of the New York State Railways for permission to charge an increased fare in Utica and vicinity. The company now is charging 7 cents. The petition asks permission to charge 10 cents cash or ten tickets for 75 cents.

Thrift Ideas to Be Rewarded.—The Southern Public Utilities Company, Charlotte, N. C., will offer three prizes of \$5, \$3 and \$2 respectively to its employees for the best thrift letters to be published in the February number of the Southern Public Utilities Company's magazine. The letters should relate to a practical thrift problem.

Offices Moved.—Executive offices of the International Railway, Buffalo, N. Y., are to be moved from the Littell Building at Franklin and West Huron Streets. The main executive offices will be taken to the D. S. Morgan Building, but the claims department will be shifted to the Virginia Street carhouse in Main Street. The new locations will save the International Railway a large sum of money in rentals each month over those now paid.

Fare Increase Sought in Ironwood.—The Lake Superior District Power Company has asked the City Commission of Ironwood, Mich., to join with it in submitting a proposal to the Public Utilities Commission for adjusted street car rates in Ironwood. The City Commission will take action after giving Walter Hodgkins, general manager of the company, a hearing. According to an audit, submitted by the company, the net deficiency for the year just ended was \$48,928 when consideration is given to interest on investment at 4 per cent, operating expenses and depreciation on property of 3 per cent. The company, about two years ago, rehabilitated the system in Ironwood at an expenditure of \$221,465 and during 1925 was \$19,749 short of meeting its operating expenses. It is now operating with a 5-cent fare in Ironwood and a 6-cent fare in Hurley, Wis., just across the state boundary.

Remodeled Cars Given Trial.—The first of 24 street cars of the Indianapolis Street Railway, Indianapolis, Ind., being rebuilt and equipped with devices so the cars may be operated by one man has been given a trial run. The cars will be equipped with stop lights in addition to other features. Passengers enter from the front but leave by the rear. When the rush hours come it will be possible for a conductor to stand at the door, collect the fares quickly and then alight and let the car proceed as a one-man car.

To Pay with Check in Louisville.—As a protection to the paymaster and the employees themselves, the Louisville Railway, Louisville, Ky., will hereafter pay its trainmen by check instead of cash. The notice announcing the change refers to the risk from highwaymen as well as the likelihood of losing the money.

Sunday Pass for Allegheny Valley.—The Allegheny Valley Street Railway, a subsidiary of the West Penn Railways system, was to install an unlimited-ride transferable Sunday pass for 50 cents effective Feb. 7. The pass will be available for any and all of the eight zones between Aspinwall (Greater Pittsburgh) and Natrona. Operation of this railway, however, is divided into a six-zone division between Aspinwall and New Kensington and a two-zone division between New Kensington and Natrona. The standard fares are 8 cents cash and 6½-cent tickets per zone, but there is also a variety of commutation rates.

Opening of New Systems into Yonkers.—The first train was run into Yonkers, N. Y., on Feb. 7 on the recently electrified Yonkers branch of the Putnam Division of the New York Central Lines. A committee headed by Mayor William A. Walsh met the trains.

Fifth Traffic Plan Submitted in Baltimore.—The Baltimore, Md., Traffic Survey Commission held its final public hearing on Feb. 3 for the discussion of plans to reroute some of the lines of the United Railways & Electric Company. The four plans submitted by Kelker, De Leuw & Company, Chicago experts, were considered and a fifth plan was submitted to the committee. The new plan was prepared by the Retail Merchants' Bureau of the Baltimore Association of Commerce and several of the various trade organizations in the downtown section of the city. This plan was drawn with the view of eliminating some of the objections which were voiced at previous hearings and is to be considered by the commission in preparing its final draft.

Aid of Merchants Enlisted.—The question of transportation and traffic in Jamestown, N. Y., and vicinity was discussed at a dinner given by officials of the Jamestown, Westfield & Northwestern Railroad for 250 manufacturers and merchants of Jamestown on Jan. 25. Robert H. Jackson, one of the three administrators of the estate of the late Sheldon B. Broadhead, set forth in detail the serious financial situation which confronts the Jamestown, Westfield & Northwestern. He made a plea for increased passenger business and suggested that merchants divert to it a share of their freight business under the through freight rates established by the Jamestown, Westfield & Northwestern in connection with the New York Central Lines, the Pennsylvania Railroad and the Nickel Plate Road. Some few years ago the Jamestown, Westfield & Northwestern Railroad suffered a decline in its interurban passenger business and in the hope of recouping its losses in 1923 started a through system of freight handling. The plan was outlined in the *ELECTRIC RAILWAY JOURNAL*, issue of Nov. 21, 1925, page 924.

Recent Bus Developments

Another Bus Report in New York City

With a recommendation that the Board of Estimate and Apportionment first determine a policy of awarding omnibus franchises on a basis of either city-wide, borough-wide or system operation, on the best possible terms for the city and satisfactory service to the traveling public, the Board of Transportation of New York City has filed with the Board of Estimate its fifth report on pending applications for bus grants.

The board makes no recommendation as to which of the petitioners should be granted a franchise, as it was not directed to do so by the Board of Estimate, but it is prepared, the report states, to make such recommendations, without delay, if the board so desires.

The report restates a summary of facts as to previous applications and as to nine new or amended applications for franchises to operate bus lines. It again points out the necessity for securing satisfactory service at a 5-cent fare as far as possible.

The report favors a franchise grant borough-wide in area or by systems made up of contiguous territory, where most of the travel is in one community, or between areas that are developing as communities.

New Haven Operates Buses Over 777 Miles of Road

President Pearson of the New York, New Haven & Hartford Railroad announces that the railroad is now operating buses over 777 miles of road and in addition to this is operating gasoline rail cars on 567 miles of rail. He says that in the development of modern transportation, automobile operation over the public highways has become a factor. At the beginning there was some doubt in the minds of the railroad officials whether the New Haven Railroad could afford, in view of its limited financial condition, to invest in this new transportation facility. As time went on it became apparent the company must be in a position to protect itself from further diminution of revenue through the taking away of passengers by automobiles. In many instances, he says, the beginning of highway operation by the railroad means better transportation service for communities than they ever had before. Until Mr. Pearson made this statement there was little realization on the part of the public of the extent to which the railroad had gone in its plans for coordinating steam, electric railway and bus transportation.

Date Set for Hearing on Buffalo Buses

Tameling, Keene & Company, New York, who are said to have completed plans for financing the 5-cent bus service in Buffalo for which Ernest M. Howe, Detroit, has secured a franchise

from the municipal authorities, have informed the New York State Public Service Commission that all details of the plan will be outlined to the commission on Feb. 15. The state utilities board previously had granted two adjournments to Mr. Howe and his associates so the financing plans could be worked out.

Opposition to the Howe lines will be entered by the Buffalo Chamber of Commerce, the Buffalo Federation of Business Men's Associations and the International Railway, which is operating three bus routes in Buffalo under a subsidiary, the International Bus Corporation. The opposition contends that the 5-cent buses to be run over thirteen routes covering 71.5 miles of operation will have a very serious effect upon the local railway, which operates on an 8-cent fare or two tokens for 15 cents. The proposed bus routes would parallel many of the existing car lines.

Missouri Commission Cannot Rule on Bus Fares

The Missouri Public Service Commission ruled on Feb. 2 that it had no jurisdiction over bus lines operated in the state and under the public service law was without power to regulate such utilities. The decision was on the application of the Springfield Traction Company, Springfield, Mo., which had sought permission to increase bus fares from 5 to 7 cents to conform to the fare charged by its street cars. The application was filed on Dec. 16, last. The petition pointed out that the buses were operated at a loss of \$49,003 during the period Sept. 1, 1924, to Sept. 30, last.

The application was the first of its kind ever received by the Missouri Public Service Commission. It was thought that the commission might have jurisdiction because the buses are being operated in conjunction with the railway system. The Springfield Traction Company has exclusive bus rights in Springfield under a city ordinance.

Many Applications for Bus Rights in Brooklyn

Applications of fourteen companies for franchises to operate bus lines in Brooklyn were submitted on Feb. 1 to the Board of Estimate of New York City by its division of franchises and considered by the board in committee of the whole. Action was deferred until the committee meeting on Feb. 15 to give the members time for consideration. The question of bus operation is closely allied with the general transit problem and will be considered by Mayor Walker in his conferences with the members of the Transit Commission and the Board of Transportation. So far as is known none of the companies is affiliated with any of the railways operating in the territory to be covered by the routes of the applicants.

Twin City Company Expands in Bus Field

The Twin City Rapid Transit Company, Minneapolis, Minn., through its subsidiary corporation, the Twin City Motor Bus Company, now owns all the bus lines carrying passengers between Minneapolis and St. Paul, in addition to some suburban routes. This has been accomplished by the purchase of the third and last interurban bus line, the Minneapolis & St. Paul Bus Line, Inc., operating twelve buses. With the Twin City Motor Bus Company line and the American Auto Transit Company line, previously acquired, the railway now operates buses between the Twin Cities on three major traffic routes.

The Twin City Motor Bus Company is putting seven new buses in service on interurban lines. The bodies, built at the Eckland Body Company shops, are on Mack (International) chassis. The railway company now has 84 buses.

Net revenues on the buses over the 7½ per cent return allowed on the railway investment will be turned over to the street car companies. Thus the railway has taken over bus lines that were eating into the revenues of the electric companies and may get additional revenue from the bus lines.

Indiana Decisions Apparently in Conflict

The Superior Court at Terre Haute, Ind., has handed down a decision upholding the state law enacted by the last Legislature providing that buses operating in cities must secure certificates of necessity and convenience from the Indiana Public Service Commission. The ruling came on the hearing of a petition of the Terre Haute, Indianapolis & Eastern Traction Company for an injunction against nineteen bus operators. Counsel for the bus men argued that a license issued by the City Council was a contract which took precedence over the state law, but the court ignored this construction of the statute. The railway also asked for an accounting from the operators and a judgment for the sums that were received by them for carrying passengers since the passage of the new law.

At about the same time came another decision from Hammond, Ind., in the Lake County Superior Court of a somewhat different nature. The court ruled that certificates of the Public Service Commission permitting operation of buses within cities cannot supersede city ordinances. The opinion denied the petition of the Gary Street Railway to enjoin the city from enforcing an ordinance prohibiting such transportation. The court held that cities have an inherent right to regulate transportation facilities within their own limits.

Permission Sought for New Line.—The Philadelphia Rapid Transit Company, Philadelphia, Pa., recently applied to the Public Service Commission for permission to remove its tracks from Race and Vine Streets between Second and 23d Streets, Philadelphia, to make room for an authorized bus

route. Commissioner Benn, who heard the application, said he would recommend approval. The commission rejected a similar application several months ago because of a clause in the councilmanic ordinance covering the city and the P. R. T. agreement which would have given the railway the exclusive right to operate over these streets. That clause was eliminated in the application presented on Feb. 4. The company also applied for permission to establish a bus route to serve East Germantown and Logan.

Boston Bus Line Extended.—The Boston Elevated Railway, Boston, Mass., has extended its bus line being operated between Kendall Square and Bowdoin Square to Lafayette Square. This change in routing became effective on Feb. 1.

Line Discontinued—Would Run Buses.—The Grand View Railroad, a 6-mile line in Kirkwood, near St. Louis, Mo., has been discontinued. The St. Louis Bus Company, a subsidiary of the United Railways, has asked the St. Louis Board of Public Service to substitute buses for the cars. The route the bus company would operate is 2 miles. The buses would connect with the Broadway and Bellefontaine Street car lines.

Petitions for Bus Substitution.—The Menominee & Marinette Light & Traction Company has petitioned the Marinette, Wis., Common Council to replace its Hall and Pierce Avenue street cars with buses. In presenting the company's case before the Council, A. J. Goedjen, general manager, stated that traffic on this line was only about 75 per cent of the figures established three years ago and that the line had shown no profit in 1925.

Bus Line Serves Useful Purpose.—The Portland Electric Power Company, Portland, Ore., is putting on transfer buses to serve the Eastmoreland district and Reed College, joining the Error Heights car line and others. The run is about 2 miles. The bus line eliminates the railway traffic on a one-way viaduct.

New Line in Northwest St. Louis.—The St. Louis Board of Public Service on Feb. 2 voted unanimously to grant a permit to operate a bus line in Northwest St. Louis to the St. Louis Bus Company, a subsidiary of the United Railways. The bus line will use Natural Bridge, Marcus, Kingshighway Northeast and Florissant Avenues, and will provide transportation for a new territory that has not adequate street car facilities. A 10-cent fare will be charged with transfers to connecting street car lines. S. W. Greenland, representing the reorganization committee of the United Railways, presented to the board a petition signed by 900 residents of the district asking for the service. About fifty home owners were on hand to support the application.

Bus Expansion by East St. Louis Line.—The Red Line Motor Bus Company, an auxiliary of the East St. Louis & Suburban Railway, is now operating two buses each way daily between Greenville, Ill., and St. Louis, Mo., via the Eads Bridge. In addition, two other buses will run from Greenville to Collinsville each way, making connection

with the suburban street cars in Collinsville.

Cross-town Line in Fond Du Lac.—Permission to operate a cross-town bus line, has been sought of the City Commission of Fond Du Lac, Wis., by the Wisconsin Power & Light Company. This proposed city bus system would work in harmony with the company's railway with interchangeable transfers. If operating conditions justify the service will be extended to other parts of the city which do not now enjoy transportation service. To obtain the sentiment of residents living in the districts on routes and schedules the company is conducting a city-wide house-to-house survey. Equipment which the company proposes to use would comprise buses of the street car type.

New Service Started.—The Los Angeles Motor Bus Company, a subsidiary of the Pacific Electric Railway and the Los Angeles Railway, started the operation of buses on Riverside Drive, Los Angeles, Cal., on Feb. 1. The line extends from Dayton Avenue and San Fernando Boulevard along Riverside Drive to Whitmore Avenue and Alessandro Street. A connection will be made with certain Los Angeles Railway and Pacific Electric cars. The line will skirt the bottom of the Elysian Park Hill. The fare is 10 cents with transfer privilege to and from the railway cars.

International Application Held Up.—Plans of the International Bus Corporation, a subsidiary of the International Railway, Buffalo, to start a bus line in Richmond Avenue on a similar basis as the other three local bus lines are being held up. The delay is due to the hearing by the Public Service Commission on the application of Ernest M. Howe, Detroit, for permission to operate thirteen bus lines over 71.5 miles of streets at a 5-cent fare under the franchise obtained from the City Council last fall. The International also plans the extension of its Delaware Avenue bus line from the Buffalo-Kenmore city line to the north village line of Kenmore at an additional 5-cent fare or the sale of round-trip tickets for 25 cents. The fare inside the city is now 10 cents.

Opposes Bus Routes.—The Hartford & Springfield Street Railway, through Harrison B. Freeman, receiver, appeared recently in opposition to the petitions of the New England Transportation Company to operate bus routes between Hartford and Broad Brook, Conn., and between Hartford and Suffield, Conn. The New England Transportation Company, however, was authorized to operate and started its service on Jan. 17. Mr. Freeman declared the lines might prove an entering wedge toward direct competition for his company.

Bus Stock Increased.—The Public Service Transportation Company, a bus subsidiary of the Public Service Railway, Newark, N. J., filed an amendment to its certificate of incorporation with the Secretary of State on Jan. 28 increasing its authorized capital stock from 1,000,000 to 1,500,000 shares of no par value. The increase was authorized at a directors' meeting Jan. 12 and ratified at a subsequent stockholders' meeting.

Financial and Corporate

Reappraisal Suit at Rochester to Be Heard in March

Trial of the reappraisal suit brought by the city of Rochester, N. Y., to determine the valuation of the Rochester lines of the New York State Railways is scheduled for the equity term of Supreme Court, Justice Stephens presiding, on March 3.

Clarence M. Platt, corporation counsel for the city, and the law firm of Harris, Beach, Harris & Matson, for the railways, already are marshaling their arguments in this long-standing legal controversy.

The Common Council rejected the compromise offer of the traction company to lop off \$1,400,000 from the base valuation of \$19,216,000 as originally fixed in the service-at-cost contract under which the railway operates in the city.

The city's position is that war time prices prevailed in the appraisal and that the valuation as fixed then is excessive. The decision of the Appellate Division, Third Department, in the certiorari proceeding to review the rates charged by the Peoples Gas Company of Oswego is being studied as bearing on the Rochester case.

In this decision the court held that the Public Service Commission was in error in not allowing value as a going enterprise and in not considering the good will of the properties. These points were not considered in the Rochester appraisal.

James F. Hamilton, president of the New York State Railways, contends that the proceeding will result in establishing a higher valuation for the Rochester properties. He declared that the company's offer of settlement was solely to avoid litigation costly to all parties concerned.

Mr. Fitkin Comments on Newport News Purchase

According to A. E. Fitkin, president of the National Public Service Corporation, 80 per cent of the preferred and common stocks of the Newport News & Hampton Railway, Gas & Electric Company has been acquired. The price paid for these stocks is understood to have been \$110 a share. As indicated previously in the ELECTRIC RAILWAY JOURNAL the properties just taken over will be combined with the Virginia-Western Power Company, Virginia-Northern Power Company and other Virginia holdings of the Fitkin interests in a Virginia operating company which will be a subsidiary of the National Public Service Corporation.

Acquisition of the Newport News & Hampton Railway, Gas & Electric Company will add more than \$2,000,000 to yearly gross revenues of the National Public Service Corporation. The Newport News company serves without competition a population of about

60,000 over a territory of 14 miles, extending from Old Point Comfort on the eastern end of the peninsula through the towns of Phoebus and Hampton to Newport News. The territory is almost entirely industrial, the largest single industry being the Newport

News Shipbuilding & Dry Dock Company.

In commenting on this purchase, Mr. Fitkin said:

Our engineers consider the Newport News & Hampton Railway, Gas & Electric Company one of the finest properties from the standpoint of physical efficiency they have examined in a long while, and we believe the territory served has recovered from the after effects of the war and is launched upon a great era of expansion and prosperity. The property has been ably managed, public relations are excellent and the company will form an important link in our Virginia operations. The company will be under management of the General Engineering & Management Corporation.

\$502,195 Net for Boston Elevated

Seventh Annual Report of Public Trustees Makes a Remarkable Showing —Bus Business Growing—Statistics of Operation Deserve Careful Study—Gratifying Increase in Riding

THE Boston Elevated Railway, Boston, Mass., which is operated by public trustees, has just presented its annual report to the Massachusetts Legislature. The period covered is the year 1925. The trustees show \$502,195 as the balance of receipts above cost of service. In 1924 there was a deficit of \$636,696. The total receipts for the year were \$34,547,379. This is the largest amount during the five years that are compared in the report. The operating expenses, such as wages, material, damages, depreciation and fuel, were \$24,405,735. Added to this were

award, were continued unchanged by the arbitration board of 1925, but the board increased the differential for one-man car and bus operators from 8 cents to 10 cents an hour above the basic rate.

In order to meet the situation created by the 1924 award the repair shops were operated throughout the greater part of the year on a five-day week, track reconstruction was reduced somewhat below the average amount necessary, car mileage operated was reduced 500,000, one-man car operation was considerably increased and many lesser economies were put into effect.

Reduction in cost of power and cost of accidents, together with an increase of \$386,716 in operating revenues, materially assisted in reaching the favorable result shown.

The increase in bus transportation is shown by the following table of miles operated:

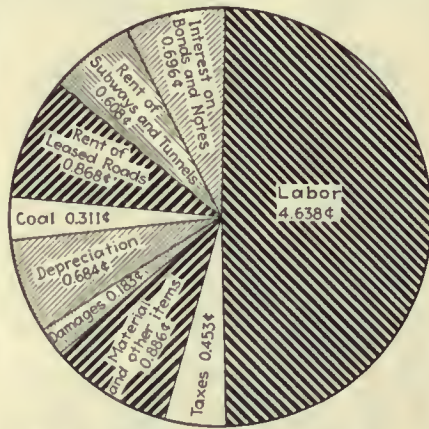
1922	63,937
1923	465,382
1924	890,901
1925	2,472,456

At the present time there are 25 routes in operation employing 157 buses. In connection with this business the chartering of special buses in place of special cars and supplementary to special car service is being developed. Last year the revenue from this special bus service was \$15,130.

On the subject of buses the trustees say in part:

"It was early decided that the public would best be served by seeking to discover where bus service would be desirable and then supplying it in conjunction with rapid transit and surface electric lines. In large metropolitan centers better and more economical transportation can in general be supplied by electric cars, but upon lines where traffic is not sufficient to warrant the heavy investment in track and electric system or where streets are so narrow or congested by vehicular traffic that the electric car is continuously blocked and delayed in its passage the bus fills an important place.

"If competing bus lines were established within the area served by the railway system operated by this board in behalf of the commonwealth the revenue of passengers so diverted would constitute a direct loss to the



Average Receipts per Revenue Passenger, 9.461 Cents. Cost of Service, 9.327 Cents per Revenue Passenger

taxes, rents, interest and miscellaneous items to the amount of \$34,045,185. The number of revenue passengers carried in 1925 was 365,036,286, a reduction of 17,852,562 from last year.

The report shows that of the loan assessment of 1919 it paid back to the contributing cities and towns only \$20,581 last year, as against \$1,114,557 in 1924. On this loan the sum of \$2,327,816 is due to the cities and towns of Boston, Cambridge, Somerville, Brookline, Medford, Malden, Everett, Watertown, Arlington, Chelsea, Newton and Belmont. In the reserve fund there is \$637,797, compared with \$176,868 one year ago.

Close supervision of expenditures was necessary to reach this result. Basic wage rates of 72½ cents an hour for surface motormen and conductors, established by the 1924 arbitration

COMPARATIVE DIVISION OF RECEIPTS AND EXPENDITURES OF THE BOSTON ELEVATED RAILWAY FOR YEAR ENDED DEC. 31

	1925	1924	1923	1922	1921
Total receipts.....	\$34,547,379	\$34,175,319	\$34,096,813	\$32,699,176	\$33,277,025
Operating expenses:					
Wages.....	16,931,549	17,358,670	16,224,275	14,772,340	15,563,255
Material and other items.....	3,175,981	3,203,378	3,236,805	2,903,650	3,093,934
Injuries and damages.....	666,488	740,025	822,775	555,355	518,249
Depreciation.....	2,496,000	2,496,000	2,004,000	2,004,000	2,004,000
Fuel.....	1,135,715	1,424,058	1,842,396	1,853,111	1,663,617
Total operating expenses.....	\$24,405,735	\$25,222,133	\$24,130,253	\$22,088,458	\$22,843,056
Taxes.....	1,652,517	1,623,995	1,688,139	1,587,186	1,546,758
Rent of leased roads (including dividend rental under chapter 159, Acts of 1918).....	3,169,448	3,175,566	3,185,577	3,646,595	4,203,061
Subway and tunnel rents.....	2,217,470	2,125,593	2,026,936	2,008,414	1,963,737
Interest on bonds and notes.....	2,540,909	2,602,891	2,316,026	1,891,315	1,494,258
Miscellaneous items.....	59,104	61,835	70,247	65,016	54,707
Total cost of service.....	\$34,045,185	\$34,812,016	\$33,417,181	\$31,286,987	\$32,105,580
Loss for year.....		\$636,696			
Gain for year.....	\$502,193		\$679,631	\$1,412,189	\$1,171,444

Profit and loss items not included in above.

commonwealth, to which accrues all receipts after payment of expenses. In addition to that loss the service furnished to the public would be impaired. Consequently, this board has consistently taken the position that no competing bus lines should be permitted within the territory served by this system and has adopted the policy of standing ready to furnish bus service within that general territory wherever it appeared in the public interest that bus service should be given. By this

method better transportation is supplied, since with street cars and buses under one management the service given by each can be co-ordinated and used to improve instead of to injure the service given by the other. Free transfer from car to bus and vice versa is possible under such a unified system."

During the year new garages accommodating 56 buses each were constructed at the Arborway near Forest Hills and on Salem Street, Medford, and the first unit of the Lotus Place car

repair house has been practically completed.

A prepayment station has been constructed at Egleston Square and an area provided at Kendall Square for interchange between Cambridge subway trains and buses operating from this point.

During the year actual construction of the Dorchester tunnel extension was begun by the Transit Department of the city of Boston. The first section of the work has been completed and substantial progress made upon the second section.

More than 13 miles of track and special work have been rebuilt and 2.31 miles extensively repaired.

All-night service of cars in the Boylston Street subway has been started and a system of stopping cars at particular berths has been put into effect in subway stations.

In order to encourage parking of automobiles outside of the congested centers and inducing such riders to make their journey into the city by rapid transit, land located near the Everett Terminal was leased for storage purposes. Direct connection of a large garage adjacent to this land with the Kendall Square station of the Cambridge subway awaits action by the Legislature authorizing the Department of Public Utilities to act for the commonwealth in giving necessary permission.

On the subject of rolling stock the trustees say:

"It is interesting to note that of the 82,450 cars in the United States 34 per cent are more than twenty years of age, while on the Boston Elevated only 12.7 per cent of the passenger cars now in service are more than twenty years old."

Sixty cars of the Cambridge subway type have been ordered to provide for operating the Dorchester Rapid Transit extension when completed. Ninety new No. 5 type cars of an order of 100 placed in July, 1925, have been received and placed in service.

For several years past the board in its annual reports and before committees of the General Court has called attention to existing limitations upon the raising of new capital for essential improvements of the railway. The board still believes the General Court should provide means for raising new

ALLOCATION OF ASSESSMENT ON CITIES AND TOWNS OF BOSTON ELEVATED DEFICIT YEAR ENDED JUNE 30, 1919

History of the 1919 Loan Assessment on Cities and Towns (Chapter 159, Special Acts 1918)

Cities and Towns	Passengers	Per Cent	Amount	Distribution of July, 1922, Repayment	Distribution of July, 1923, Repayment	Distribution of July, 1925, Repayment	Balance Due
Boston.....	2,100,423	71.9330	\$2,863,042	\$372,034	\$790,029	\$14,902	\$1,686,075
Cambridge.....	283,475	9.7081	386,397	50,209	106,622	2,011	227,553
Somerville.....	122,583	4.1981	167,090	21,712	46,106	869	98,402
Brookline.....	74,553	2.5532	101,621	13,205	28,040	528	59,846
Medford.....	59,754	2.0464	81,449	10,583	22,475	423	47,966
Malden.....	55,838	1.9123	76,112	9,890	21,002	396	44,823
Everett.....	54,823	1.8775	74,727	9,710	20,619	388	44,008
Watertown.....	41,198	1.4109	56,155	7,297	15,496	292	33,070
Arlington.....	32,477	1.1122	44,267	5,752	12,215	230	26,069
Chelsea.....	29,659	1.0157	40,426	5,253	11,154	210	23,807
Newton.....	27,201	0.9316	37,079	4,818	10,231	193	21,836
Belmont.....	18,746	0.6420	25,552	3,320	7,051	133	15,047
Quincy (Comm. of Mass.).....	15,569	0.5332	21,222	2,757	18,464		
Stoneham (Comm. of Mass.).....	3,674	0.1258	5,007	650	4,356		
*Commonwealth of Mass.....					690		690
Totals.....	2,919,973	100.00	\$3,980,151	\$517,196	\$1,114,557	\$20,581	\$2,327,816

Based on traffic counts made July 24, 25, 26, 27, 1919, in accordance with the provisions of Section 14, Chapter 159, Special Acts 1918.

* From the July, 1923, repayment, the commonwealth of Massachusetts deducted \$690.24 to reimburse itself for the difference between 126 days interest at 4.28 per cent on \$4,000,000 (Note issued July 17, 1919, due Nov. 20, 1919) and \$3,980,151.67, the amount paid to the B. E. Ry. Co.

And interest from July 17, 1919, to July 19, 1923, on amount the state deducted to pay assessment of Quincy and Stoneham.....

Amount of expense to state to be assessed to towns and cities pro rata to their original contribution.....

† Credit.

STATEMENT OF REVENUE PASSENGERS CARRIED BY BOSTON ELEVATED RAILWAY

	5c. Fares	6c. Fares	7c. Fares	8c. Fares	10c. Fares	Pupils' Tickets 5c.	Special Car and Special Bus Passengers (See Note)	Total Revenue Passengers	Present Yearly Increase
1917—Year ending Dec. 31.....	380,819,242						198,096	381,017,338	1.99
1918—Year ending Dec. 31.....	217,203,899						100,989	348,664,700	8.49
1919—Year ending Dec. 31.....	886,034		102,619,954	28,739,858			348,664,700	324,758,685	6.86
1920—Year ending Dec. 31.....	3,846,989			173,808,769	146,162,131	3,803,815	97,936	335,526,561	3.32
1921—Year ending Dec. 31.....	23,915,742				326,496,184	5,105,588	77,800	337,252,080	0.51
1922—Year ending Dec. 31.....	71,425,347				307,624,243	5,606,105	105,990	356,593,942	5.73
1923—Year ending Dec. 31.....	94,170,518				279,851,313	5,213,664	103,618	382,149,697	7.17
1924—Year ending Dec. 31.....	85,218,867				283,660,762	4,214,132	104,285	382,888,848	0.19
1925—Year ending Dec. 31.....	3,853,807	55,937,785			283,569,003	4,443,228	107,975	365,036,286	4.66*

5-cent fare previous to Aug. 1, 1918.

7-cent fare Aug. 1, 1918.

8-cent fare Dec. 1, 1918.

Pupils' tickets (5-cent) Jan. 1, 1919.

10-cent fare July 10, 1919.

First 5-cent fare line (without transfer) Aug. 23, 1919.

First 5-cent local fare line March 26, 1921.

5-cent fare for children under fourteen years (not including children under five years) June 14, 1922—discontinued Nov. 5, 1924.

6-cent local fare Nov. 5, 1924.

Note—Previous to 1908 special car passengers included with 5-cent fares.

*During the years 1922, 1923 and 1924, one passenger making a single journey for which he might pay two 5-cent fares was counted as two revenue passen-

gers. The substitution in November, 1924, of 6-cent tickets for 5-cent cash fares has often resulted in the payment of a 10-cent fare by such a passenger with a consequent reduction in the company's figures of total revenue passengers carried, though the gross

passenger revenue for the year 1925, which increased \$371,269, would indicate substantially the same number of passengers carried by the railway in 1925 and 1924.

Italics denote decreases.

capital. That matter has been recently considered by a special recess commission in a report now before the state law-making body. The trustees say that pending consideration of that report by the court the board feels that it should confine itself to operating the railway at the highest efficiency possible with existing facilities and such property as can be purchased from time to time from the allowance to offset the annual exhaustion of the depreciable property.

The average pounds of coal consumed per kilowatt-hour direct-current at the cars was 1,973 in 1925 compared with 2,068 last year. This is the lowest of any year in the history of the railway. The average cost of coal per ton during 1925 was \$5.22, compared with \$5.921 last year, and is also the lowest since 1917. There was a reduction of 23,078 tons of coal burned as compared with 1924.

An improvement has been made dur-

ACCIDENTS PER MILLION CAR-MILES

	1925	1924
One-man cars	204	205
Two-man cars	245	249

ing this year in the accident record. Operating charges on this account were reduced from \$914,043 in 1924 to \$846,235 in 1925.

The seventh full year of public operation closed on June 30, 1925, with a balance of receipts over cost of service of \$20,581. This amount was repaid to

STATEMENT OF RESERVE FUND OF BOSTON ELEVATED RAILWAY ON DEC. 31, 1925

Balance Jan. 1, 1925	\$176,868
Excess of receipts over cost of service:	
January	\$269,649
February	118,183
March	211,955
April	130,636
May	139,081
October	117,703
November	45,265
December	289,343
	\$1,321,820
Excess of cost of service over receipts:	
June	\$25,792
July	249,477
August	367,593
September	176,763
	\$819,628
Excess for the year of receipts over cost of service	502,191
	\$679,060
Amount refunded to commonwealth of Massachusetts, July 1, 1925	20,581
	\$658,478
Profit and loss items, Dr.	20,680
	\$637,797
Balance—Dec. 31, 1925	\$637,797

STATEMENT OF SPECIAL TRUST FUND OF BOSTON ELEVATED RAILWAY, DEC. 31, 1925

Principal of trust fund as established	\$1,500,000
Accretions and accumulations to Dec. 31, 1925	633,495
Total special trust fund	\$2,133,495
Income from June 10, 1922, to Dec. 31, 1925	\$330,694
Less amount paid on account of retirement of second preferred stock, as follows:	
7184 shares purchased July, 1923	\$72,193
919 shares purchased July, 1924	90,319
1,116 shares purchased July, 1925	111,685
	\$274,198
	\$56,496
Investments	2,126,840
Cash on deposit	\$63,151

TRAFFIC STATISTICS OF BOSTON ELEVATED RAILWAY FOR YEAR ENDED DEC. 31

	1925	1924	1923	1922
Round trips operated	7,185,587	6,994,749	6,488,082	6,059,531
Passenger revenue	\$33,790,441	\$33,419,172	\$33,297,951	\$31,834,022
Passenger revenue per car-mile (cents)	60.93	59.69	61.61	62.94
Passenger revenue per car-hour	\$5.86	\$5.67	\$5.71	\$7.09
Passenger revenue mileage	\$55,461,094	\$55,988,679	\$54,049,665	\$50,575,088
Passenger revenue car-hours	5,767,957	5,894,115	5,826,993	4,487,400
Revenue passengers carried	365,036,286	382,888,848	382,149,697	356,593,942
Revenue passengers carried per car-mile	6.582	6.838	7.070	7.051
Revenue passengers carried per car-hour	63.28	64.96	65.58	79.47

*Car-hours, American Electric Railway Association Standard, adopted Feb. 1, 1923.

†Including motor bus mileage. . . 1922, 63,937 1923, 465,382 1924, 890,901 1925, 2,472,456

COMPARATIVE POWER STATION STATISTICS OF THE BOSTON ELEVATED RAILWAY

	1925	1924	1923	1922	1921	1920	1919
Tons of coal burned	217,414	240,493	260,032	273,441	215,870	258,087	287,670
Pounds of coal per kilowatt-hour	1.973	2.068	2.264	2.553	2.174	2.353	2.835
Average price of coal per ton	\$5.22	\$5.921	\$7.085	\$6.777	\$7.71	\$10.07	\$5.91
Net cost of power for car service per kilowatt-hour (cents)	1.021	1.093	1.227	1.414	1.172	1.921	1.307
Net cost of power per total revenue car-mile (cents)	4.428	4.833	5.468	6.153	4.815	8.538	5.439
Direct current annual output (kw.)	246,835,300	260,401,225	257,270,357	239,905,874	222,461,060	245,676,503	239,892,118
Direct current maximum hour output (kw.)	85,660	86,245	82,965	78,755	75,905	72,295	71,760

COMPARATIVE PASSENGER STATISTICS OF BOSTON ELEVATED RAILWAY—REVENUE PASSENGERS CARRIED

Year	Week Day Average	Saturday Average	Sunday Average	Holiday Average	Total for Year
1925	1,066,317	1,172,871	577,200	650,007	*365,036,286
1924	1,109,861	1,216,132	630,755	727,191	*382,888,848
1923	1,109,274	1,196,301	652,404	758,915	*382,149,697
1922	1,030,303	1,144,320	617,148	691,890	*356,593,942
1921	975,745	1,060,295	578,860	696,691	337,252,080
1920	960,737	1,072,319	591,063	703,634	335,526,561
1919	934,916	1,078,635	596,182	706,429	324,758,685
1918	985,384	1,147,809	638,902	775,634	348,664,700
1917	1,073,943	1,249,588	728,847	857,902	381,017,338
1916	1,050,038	1,218,749	718,804	832,962	373,577,908
1915	992,283	1,140,046	685,726	846,860	352,469,586

*Note—During the years 1922, 1923 and 1924 one passenger making a single journey for which he might pay two 5-cent fares was counted as two revenue passengers. The substitution in November, 1924, of 6-cent tickets for 5-cent cash fares has often resulted in the payment of a 10-cent

fare by such a passenger, with a consequent reduction in the company's figures of total revenue passengers carried, though the gross passenger revenue for the year 1925, which increased \$371,269.51, would indicate substantially the same number of passengers carried in 1925 and 1924.

the cities and towns served by the railway.

A gratifying increase in riding and revenue during the latter part of 1925 and early 1926 has permitted the resumption of full time work in the shops and a substantial increase in the number of car-trips and car-miles operated.

Net Earnings at Springfield Improve

The Springfield Street Railway, Springfield, Mass., has announced a 5 per cent dividend on 1925 business, compared with a 2 per cent dividend for 1924. Net income for 1925 was \$239,135, compared with \$133,846 in 1924, a gain of \$105,289. There was a loss of more than 4,000,000 revenue passengers for the year. An increase of fares to the 10-cent basis and the extension of the use of the one-man cars account for the improved showing in net income.

Bus operations of the company showed a 50 per cent increase of mileage in 1925. Two new suburban lines were added and the number of buses increased to 25. Passengers carried by bus totaled 1,356,316, out of a grand total of 39,602,870. Total passenger revenue for the year increased \$55,040 over the previous year. Comparative statistics for the two years follow:

STATEMENT OF EARNINGS OF SPRINGFIELD STREET RAILWAY

	1924	1925
Gross revenue	\$3,173,616	\$3,228,746
Operating expenses	2,760,564	2,697,362
Taxes, rentals, interest and other fixed charges	279,205	292,247
Net income	133,846	239,135
Dividends	*93,094	†232,735
Surplus	40,752	6,400

* 1924, 2 per cent. † 1925, 5 per cent.

Income Higher in 1925 Period.—The gross income for the last six months of 1925 for the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., was \$22,463,954, against \$21,448,951, in 1924. The net income after charges was \$2,994,524, against \$2,598,524 for the six months period ended December, 1924.

More Passengers in St. Louis.—Operating on the average 33 cars a day fewer during the last quarter of 1925 than were used in the corresponding period of 1924, the United Railways, St. Louis, Mo., carried 654,429 more passengers. A total of 66,998,669 revenue passengers was carried against 66,344,240 from October through December of 1924. The cars of the company made a total of 1,459,036 trips, or 41,018 fewer than in the last quarter of 1924. Miles traveled by the cars the last quarter totaled 9,501,723, against 9,789,677 in a similar period of 1924. The quarter ended Dec. 31, 1925, showed an increase of 4,246,379 passengers compared with the quarter ended Sept. 30, 1925.

Purchase Rumors at Portland Denied.

—Persistent reports that the American Power & Light Company interests had opened negotiations for purchase of the control of the Portland Electric Power Company, Portland, Ore., have been denied by Franklin T. Griffith, president of the company.

New Director Elected.—Ed Crawford has been added to the board of directors of the Shreveport Railways, Shreveport, La.

Small Balance for Transportation Area.—The Athol & Orange Transportation Area for 1925 reports passenger revenue of \$41,908 and total revenue of \$43,392. Expenditures were \$41,768, leaving a balance of \$1,624. Only \$31 was paid out for damage claims during the year. The present system of operation under special permissive

legislation from the State of Massachusetts has been in force 21 months.

Bond Issue Authorized.—The Key System Transit Company, Oakland, Cal., has been authorized by the Railroad Commission to issue and sell \$2,500,000 of series "C" first mortgage 5½ per cent bonds, due July 1, 1938, at not less than 94 per cent of face value, plus accrued interest. The proceeds are to be used to pay indebtedness, reimburse its treasury and for additions and betterments.

Book Reviews

Proceedings of Fifteenth Annual Convention, Pacific Claim Agents Association

This 32-page pamphlet contains the papers and a brief reference to discussions at the annual meeting of the association, held at Los Angeles July 22-24, 1925. The report of this convention was published in the issue of *ELECTRIC RAILWAY JOURNAL* for Aug. 8, 1925.

Second Technical Conference of the State Utility Commission Engineers

Published by the Department of Commerce, Bureau of Standards. 98 pages.

This is a report of the meeting held March 6, 1924, at the Bureau of Standards, Washington. Discussion of the subject of utility valuations and rates occupied the first day. The second day the discussion was more diversified. Perhaps the principal topic, however, was rural extensions and rural electric service.

Labor Laws of the United States

The Bureau of Labor Statistics of the United States Department of Labor has been obliged again to revise its publication of labor legislation of the United States, being the sixth compilation of this character published by this office. By summarization and abridgment, the contents of the two volumes of Bulletin 148, published in 1914, and nine succeeding annual bulletins, including also the legislation of the years 1923 and 1924, have been condensed into a single volume (Bulletin No. 370). The result is a volume of convenient size containing the substance, and in many instances the full text, of all existing labor legislation except that relating to workmen's compensation, which is incorporated in a separate series of bulletins.

Few new subjects appear, the current tendency in labor legislation being rather to elaborate the laws regarding safety, sanitation, wage payments, the right of contract, the employment of women and children, etc., than to undertake any new departures. Administrative provisions have received attention by legislatures, and the concentration of law enforcement into the hands of a single agency is a tendency that is apparent. The court decisions have been expanded in some measure, and some classes of laws have received suffi-

cient discussion to indicate the status of the type of legislation under consideration. Thus, in the matter of state laws affecting interstate commerce by railroad, the power of Congress is shown to be exclusive where it has entered the field. Opinion seems to be divided as to the right of municipalities to engage in the ice business, the operation of fuel yards, etc., but the courts are practically of one mind as to laws forbidding the discharge of union workers on account of organization membership.

The volume affords the answer to many questions submitted almost daily to the bureau. It is an essential handbook to any one interested in industrial and economic law.

Planning Problems of Town, City and Region

Published for the International City and Regional Planning Conference by the Norman Remington Company, Baltimore, Md. 530 pages. Illustrated.

These are the proceedings of the conference held in New York, April 20 to 25, under the auspices of the International Federation of Town and Country Planning and Garden Cities and the National Conference on City Planning, reported briefly in the issue of this paper for April 25. City planning engineers and street railway engineers are realizing more than ever before that their problems are largely identical, and this view was emphasized in a number of the papers presented at the meeting in New York last April. It was also expressed in the resolutions adopted at the traffic and transportation round table of the conference which declared that the problem of traffic congestion and the development of adequate transportation must include all transportation agencies and that every city should adopt a traffic policy to encourage greater efficiency and organization in traffic and transportation.

A Century of Progress

Published by the Delaware & Hudson Railroad for private circulation. 755 pages. Illustrated.

In April, 1923, celebrations were held in New York City and in Scranton, Pa., of the 100th anniversary of the founding of the Delaware & Hudson Company. It was indeed an important historic occasion, for in this country corporations which have had a continuous existence of a century are very rare. Originally, the Delaware & Hudson

Company was organized to mine anthracite and transport it to the city of New York and elsewhere in the state of New York. The coal was carried first by canal and afterward by railroad. The volume under review is an account of the activities of this historic company, which, in later years, has added a number of electric railways in the eastern part of New York State to its transportation system. A very interesting chapter in the book is that describing the results of federal control of the railroad during the years from 1918 to 1920. Those who advocate government operation of railroads can well obtain an object lesson of its results from the information given in this chapter.

Underground General Associated Tramways American Tour, 1924

This is a 46-page illustrated pamphlet containing papers read at a meeting of the directors, officers and assistants of the Underground General Associated Tramways on March 2, 1925, at Hotel Victoria, Northumberland Avenue, London, England. The book is for private circulation only.

They gave up "larfing" and the world "laffed" with them on that American Tour in 1924. So it would appear from reading the papers of Clive Leese, H. S. F. Lansdown of the London General Omnibus Company and H. C. Davy and A. W. Green of the Underground, who were chosen to take the trip to America in 1924 in search of knowledge and experience. Here is a diary replete with interesting experiences that these British railway magnates had on this side of the Atlantic. The illustrations alone throw special light on what the tourists were anxious to find out and also what made a big impression on them. Mr. Leese's paper stressed the types of buses in America with the problems of the American bus designers and operators. Mr. Lansdown gave a résumé of traffic conditions in America generally. In addition he discussed labor conditions in America. Mr. Davy referred to banking of traffic receipts and wages and Mr. Green made a comparative study of the country and its people and discussed control of receipts and expenditures on the railways. He prophesied future development of transport industry with America tackling the bus question. On this point he said: "We are pre-eminent in the motor bus world today, but if we are going to retain that pre-eminence it seems to me that we shall have to fight very hard."

An interesting feature of the pamphlet is a double-page spread showing in statistical form a comparative study of the London General Omnibus Company, the United Railways of St. Louis, Fifth Avenue Coach Company, the Chicago Motor Bus Company, the Connecticut Company and the Cleveland Railway. The questions answered in the table are on hours of duty, meal reliefs, guarantee, rates of pay, reporting allowance, traveling allowance, rest days and other points that are applicable to bus operation.

The tourists referred to the meeting of the American Electric Railway Association at Atlantic City and all joined in thanking the chairman and directors for the opportunity which was afforded them of visiting America.

Personal Items

J. N. Shannahan Still in the Industry

Sale of Property at Hampton Not to Change His Railway Status—Laudatory Newspaper Comment

Plans of John N. Shannahan for the future are somewhat uncertain, but his talents will not be lost to the industry. It will be recalled that the former president of the American Electric Railway Association and head of the Newport News & Hampton Railway, Gas & Electric Company recently concluded a deal in which control of that property passed to the Fitkin interests. In the industry interest naturally centered in the question: "What is Jack Shannahan going to do?" So far as he has made any plans it is known that Mr. Shannahan will spend the next few months and possibly longer in developing large real estate holdings of the Old Dominion Land Company in and about Newport News which he purchased recently from Henry E. Huntington. He expects to remain head of Peck-Shannahan-Cherry, Inc., which firm has long operated a number of electric railways, several of which center at Syracuse, N. Y.

Jack Shannahan's record is too well known to those in the industry to need reiteration. He represents the best there is and practices what he preaches. No amount of mere biographical facts, however complete in themselves, written from within the industry would tell half so well the story of his achievements as an operating official as do the expressions of appreciation contained in the local papers at Hampton. Daily newspapers are not given to saying nice things about men and their work, particularly public utility men, unless the men and the work they do deserve it. They have other fish to fry. Most of them would rather use vitriol than varnish.

It is no more possible to cite all the expressions of appreciation by his handling of the properties than it would be to quote from them at length. Extracts from two editorials, each nearly a column in length, suffice to indicate the tenor of the comments and emphasize the fact that the value of good public relations is a real, tangible thing. The Newport News *Times-Herald* said:

The Newport News & Hampton Railway, Gas & Electric Company has sold not only a valuable property but a good name. By square dealing, honest and efficient service, respect for the rights of the public and by identifying itself with the interests of the community it served, the company has gained the respect, the confidence and the good will of the people of the Lower Peninsula, which is a most valuable asset. The company has never attempted to dicker with the municipal bodies of this section. To the contrary, it has treated those bodies with consideration, has kept no secrets from them, has laid its case in frankness and confidence before them whenever any emergency in its affairs has arisen and has consulted them before applying to the State Corporation Commission for any increase in rates; and has never gone before the commission with such a petition without having first gained the consent and co-

operation of the municipal bodies concerned. In short, the company has made itself part and parcel of the community and has heartily co-operated with the people in all movements and enterprises for the common good. It has been a good and helpful partner and has rendered service in many directions, outside of its immediate sphere of activities. The company also has been considerate of its employees, and has gained their good will, as well as that of its patrons and the general public.

We should be less than frank did we not say that the retirement of President Shannahan from the company is a matter of regret to the community. He has the full confidence and the friendly regard of this people. He has proved himself to be not only an able and honest operator of the public utilities, but a loyal, progressive, public-spirited and very valuable citizen, and his administration has given the people a sense of security. But this regret is largely alleviated by the fact that Mr. Shannahan will continue to reside here, and that he will devote his abilities and activities to the development of the Old Dominion Land Company. The *Times-Herald* is well pleased to learn that.



J. N. Shannahan

The Newport News Press said:

The company has given an efficient service and has dealt honestly and considerately with the entire community; with its employees as well as with its patrons, and it has gained the good will of all.

It is not in disparagement of the other officers to say that this is due, primarily, to the integrity and the fidelity of President Shannahan. He is an upright man and he is a loyal citizen. He has dealt with the community not in selfishness, but in the spirit of fairness and generosity. He has contributed liberally of his private means and the means of his company toward all public enterprises, and he has made the public utilities a strong agency in community progress. His indorsement of any enterprise is sufficient to inspire the confidence of investors. It is with keen regret, therefore, that the people see Mr. Shannahan retire from the presidency of the company, but it is gratifying to know that the sale of his holdings in the company does not involve his removal to another place of residence.

The manager of Fitkin Utilities, Inc., informs the *Daily Press* that for the present, at least, there will be no change of policy or in the personnel of the local management. That is a pleasing announcement, and the *Daily Press* hopes that the status quo may continue indefinitely. We are a very neighborly people, gentlemen, and we have a friendly spirit. We are also hospitable and kindly disposed to all genteel persons who may cast their lot with us. We are prepared to give you a warm Virginia welcome, and you may count upon fair treatment from the authorities and from the general public, and also upon our friendly co-operation, so long as you deal with us in the same spirit that characterized the old company.

Certainly there is comment indicating in no unmistakable terms that the praise bestowed upon Mr. Shannahan was well deserved!

Personnel Changes in Cincinnati

F. J. Venning, superintendent of shops, equipment and overhead of the Cincinnati Street Railway, Cincinnati, Ohio, has been appointed superintendent of power. His former assistant, E. J. Jones, has been named superintendent of equipment.

Mr. Venning will have charge of the operation and maintenance of the power houses, substations, overhead transmission and distribution system and inclined planes. Mr. Jones will have jurisdiction over the maintenance of cars, the operation of the Chester Park shops and all carhouses.

W. H. Lines in Charge of Railway Operations at Portland

W. H. Lines, assistant to the president of the Portland Electric Power Company, Portland, Ore., for the past year, was placed in charge of all railway departments and operations of the company on Feb. 1. He retains his former title. This new responsibility covers part of the executive duties of the late Franklin I. Fuller. President Griffith states, however, that it may be a month or more before a successor to Mr. Fuller is named.

Mr. Lines is an engineer of wide experience. He has been with the Portland Electric Power Company in various capacities for the last fourteen years.

F. W. Coen Leaves Lake Shore Electric Railway

After many years of service with the Lake Shore Electric Railway, F. W. Coen, Cleveland, resigned as vice-president and general manager, effective on Jan. 30. Under Mr. Coen's direction the property was developed into one of the largest passenger, freight and express carriers in the Central West. In addition to the transportation industry there has also been developed a large and rapidly growing light and power business. Mr. Coen has been active in the affairs of the American Electric Railway Association and of the Central Electric Railway Association, of which he is a past-president.

He has not decided whether he will again engage in the electric utility field or become identified with industry in some other line.

P. H. Gadsden Heads Philadelphia Chamber of Commerce

Philip H. Gadsden, vice-president, United Gas Improvement Company and former president American Electric Railway Association, is the new president of the Philadelphia Chamber of Commerce. In his initial address to the members of that organization Mr. Gadsden expressed the hope that it might be possible during the coming

year to bring about "closer co-operation among all the commercial and business organizations of Philadelphia." As the *Philadelphia Ledger* sees it, unity of effort among the city's business organizations is the goal worth striving for. The *Ledger* says: "If it can be attained under the inspiration and tactful generalship of Mr. Gadsden, he will have performed a public service of inestimable value."

C. L. Bartlett Massachusetts Northeastern Manager

Clifton Lewis Bartlett has been appointed general manager of the Massachusetts Northeastern Street Railway, with headquarters at Haverhill. He succeeds the late Ralph D. Hood. Mr. Bartlett was born in Haverhill in 1890. He entered the employ of the Haverhill & Southern New Hampshire Street Railway, the Northeastern company's predecessor road, in 1907 as a checker of conductors' returns. In 1925 he was made chief clerk and claim agent. He has been acting as general manager since Dec. 30.

S. L. Nicholson Made Westinghouse Vice-President

At a recent meeting of the executive committee of the Westinghouse Electric & Manufacturing Company S. L. Nicholson was elected acting vice-president. This honor follows an association of more than 27 years with the Westinghouse company and is in recognition of the noteworthy services which Mr. Nicholson has rendered to the electrical industry. He became sales manager of the Westinghouse company in 1909 and held that position until 1917, when he was made assistant to the vice-president.

Mr. Nicholson assisted in the formation of the American Association of Electrical Motor Manufacturers, which is now known as the Electric Power Club, and was its first president. He also assisted in the formation of the American Gear Manufacturers Association and the Stoker Manufacturers Association. He was chairman of the Electrical Manufacturers Council, which is the co-ordinating committee of the Power Club, Electric Manufacturers Club, and the Association of American Manufacturers of Electrical Supplies.

In 1921 he was chairman of the tariff committee of the council and represented the electrical industry on its National Industry Conference Board. Mr. Nicholson is also a member of the Electrical Safety Conference, the American Statistical Association, and the Bureau of Personnel Research of the Carnegie Institute of Technology. He is a native of Philadelphia and began his electrical career in 1887, serving various companies from that date until 1898, when he joined the Westinghouse company.

G. T. Lackey, vice-president and agent for the receivers of the Oklahoma Railway, Oklahoma City, Okla., has been made general superintendent of all the departments of the company, working under the direction of the two receivers. Mr. Lackey has been with the company seven years.

W. H. Woodin, Brill Chairman

Head of American Car & Foundry Now Interested in Companies Supplying All Forms of Transportation Equipment—Reared in Atmosphere of Cars and Car Construction

W. H. WOODIN, elected chairman of the board of directors of the Brill Corporation, newly organized to control the J. G. Brill Company and the American Car & Foundry Motors Company, has back of him a groundwork of experience in the railway equipment field which dates back to 1890. He was reared in an atmosphere of car design and cars. The name of Woodin has been associated with railway car building since the inception of that industry in this country. Mr. Woodin's grandfather was one of the organizers of the Jackson & Woodin Manufacturing Company, founded in 1842 and taken over by the American

Brill corporation and its subsidiary, the American Car & Foundry Motors Company, the Hall-Scott Motor Car Company and the Fageol Motor Company of Ohio are owned. Thus Mr. Woodin's help and advice will be available in shaping the policies of companies supplying equipment for all forms of common carrier transportation.

The extent of the operations of these companies is shown by the fact that the American Car & Foundry Company operates four passenger car building plants, sixteen freight car building plants, six wheel foundries, eight gray iron foundries and several other plants, while the American Locomotive Company operates eight plants. The facilities of the companies just brought into the new Brill organization need no reiteration.

DIRECTOR OF MANY CORPORATIONS

Mr. Woodin has many other business affiliations. He is chairman of the board of the Canadian Car & Foundry Company and a director of the American Exchange Security Corporation, the American Beet Sugar Company, the Westinghouse Electric & Manufacturing Company, the Montreal Locomotive Works, the Westinghouse Electric International Company, the General Motors Corporation, the Cuba Company, Cuba Railroad, the Compañía Cubana and the American Ship & Commerce Corporation. Like many other big business men, he has a hobby and rides it hard. He is a coin collector. With Edgar H. Adams he is the author of a standard book on American coins. He is a member of the American Numismatic Association and the New York Numismatic Club. During the war he served the public as fuel administrator for the State of New York.

Mr. Woodin was born in Berwick, Pa., on May 27, 1868. He received his technical education at Columbia University in the School of Mines, class of 1890. He served in the shops of the Jackson & Woodin Manufacturing Company at Berwick and in 1892 was made general superintendent of that plant. In 1895 he was elected vice-president and in 1899 president. When the company was taken over by the American Car & Foundry Company in 1899 he was made district manager of the Berwick plant. He later became assistant to the first vice-president of the new company and in 1902 was made a director and assistant to the president, with general direction of the company's affairs, under President Frederick H. Eaton. On Feb. 1, 1916, he succeeded to the presidency.

Changes at Fond du Lac

M. H. Frank, formerly manager of the railways of the Wisconsin Power & Light Company at Fond du Lac, has been promoted to general manager.

F. S. Whitely has been selected manager of the company's properties at Fond du Lac, succeeding M. H. Frank.



W. H. Woodin

Car & Foundry Company at the time of its organization in 1899.

Mr. Woodin is not only president of the American Car & Foundry Company, but last December was elected a president of the American Locomotive Company, succeeding Andrew Fletcher, deceased. Before that he had been a director and a member of the executive committee of the American Locomotive Company for many years. This affiliation is really more than that of one individual with several companies. The American Car & Foundry Company has large holdings of American Locomotive Company stock and Mr. Woodin himself is a large shareholder of the company.

The election of Mr. Woodin to the Locomotive company was in recognition of his executive ability, supplemented by his extended familiarity with the supply field in general and with the operations of the American Locomotive Company in particular. Similar considerations governed his election as chairman of the board of the new Brill corporation, control of which is lodged with the American Car & Foundry Company. Through the

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Large Expenditures Looked For in Ohio During 1926

Electric railways in Ohio are planning large expenditures for the purpose of bettering service during 1926. Material increases to present rolling stock are contemplated, as well as the expenditure of considerable sums for track renewals, general maintenance and improvement work on roadbeds. Figures already revealed by the budget of some of the companies total more than \$6,500,000 for these types of work.

The largest figure thus far indicated is that of the Cleveland Railway, which estimates its new capital expenditure for the year as \$4,500,000. Of this amount, it is estimated \$2,300,000 will be spent for way and structures, \$1,250,000 for modernizing existing street cars and purchasing new units, \$450,000 for bus equipment and \$500,000 for power. The Cincinnati Street Railway will undertake a \$350,000 program in improving its bus service, including provision of structures to be used for storage and repair, and estimates the amount necessary for track reconstruction at \$50,000.

Purchase of new buses, remodeling cars to the one-man type and installing new track and special work will mean an expenditure of \$317,353 by the Community Traction Company, Toledo. The People's Railway, Dayton, plans to spend \$181,895 for track renewals, \$50,894 for new work cars, \$2,525 for installment of electric switches and \$2,712 for miscellaneous equipment. New interurban cars which will be ordered by the Steubenville, East Liverpool & Beaver Valley Traction Company will cost approximately \$150,000.

The Cleveland Southwestern Railway & Light Company will spend \$80,000. Of this amount, \$30,000 will be spent in its railway department and \$50,000 in its light department. The Northern Ohio Traction & Light Company will spend approximately \$1,000,000 in its transportation division and \$1,500,000 on its light and power department. The former total includes \$350,000 for additions to the South Akron substation, \$225,000 for new buses, \$100,000 for a new freight house and \$100,000 for new freight cars. Various sums will be spent for extending its underground system, for the purchase of new transformers and equipment and for rural line extensions and the rebuilding of lines in Akron.

Other companies expecting to make material expenditures during the current year, but which have not yet indicated how extensive these will be, are the Columbus Railway, Power & Light Company, the Lake Shore Electric Railway, the Southern Ohio Public Service Company, the Cincinnati & Dayton Traction Company, the Indiana, Columbus & Eastern Traction Company, the

Pennsylvania-Ohio Electric Company and several others.

Last year electric railways in Ohio were authorized by the Ohio Public Utilities Commission to issue a total of \$9,002,320 of new securities. Of this amount, \$7,586,620 was authorized in bonds and \$1,415,700 in common and preferred stock. Indications are that the expenditures for the present year will equal if not surpass the totals for 1925.

Cost-per-Mile Basis Opposed

Manufacturers Unite Against Practice of Selling Tires to Bus Operators Under a Mileage Plan—Claim Outright Purchase Is Cheaper for Consumers

"BOTH tire manufacturers and operators of buses lose under any kind of a cost-per-mile contract per tire purchased," stated an official of one of the larger tire manufacturing companies in a recent interview with a representative of ELECTRIC RAILWAY JOURNAL. On an advancing market for crude rubber prices the operator may have a slight temporary advantage, while on a falling market the odds are all with the manufacturers. In general, the manufacturers have come to the conclusion that the purchase of tires on a mileage basis is an economic fallacy resulting in inevitable rate wars among the producers, and making it necessary for the manufacturers to establish service stations throughout the country to care for all tires sold under such an arrangement.

So much interest has been evidenced in this question by traction companies operating a co-ordinated bus and railway service that it was considered of value to obtain a general statement of the manufacturers' policies and of the conditions which have led to the adoption of those policies. Accordingly, several of the principal tire producers were questioned as to their attitude toward cost-per-mile contracts and were asked whether or not they were disposed to allow any such contracts in the future. Without an exception the answers received agreed most heartily on practically every phase of the question.

The mileage purchase plan has been tried out and has been found wanting in the estimation of the larger companies. It is true that some of the smaller producers are continuing to accept contracts on this basis. One official characterized this practice as "playing with fire." He declared that an abrupt and unexpected rise in crude rubber prices would bring many smaller companies operating on limited capital to grief with quickness and dispatch. Nor has crude rubber of late exhibited any marked tendency toward stability.

Manufacturers to Be Aided by Publicity Campaign

Plans are rapidly going forward in connection with the intensive publicity campaign which is contemplated by the special committee on co-operation with manufacturers of the A. E. R. A. As outlined in the issue of the JOURNAL for Feb. 6 the program, which is to impress upon the public the fact that some 500,000 workers are employed in the production of electric railway supplies in the United States, will embrace a complete layout of posters for bulletin boards, stickers for letters and packages, outdoor signs, etc. The posters, labels and stickers will be supplied by E. F. Wickwire, chairman of the committee, in any quantity desired free of charge. Outdoor signs may be obtained from George H. Tontrup.

Since street cars, buses, trucks and other equipment are all purchased on an outright basis, tire manufacturers see no reason why their products should not also be considered in the same light. Of course, bus operators seized upon the cost-per-mile contract as a means of "passing the buck" on at least one item of their general maintenance work. They figured that as long as the tire manufacturers were willing to undertake the servicing of tires and to give them an attractive price for this service, there was no reason why they should not relieve themselves of this particular worry. On the other hand, the manufacturers soon discovered that selling tires is one thing and selling service quite another. Furthermore, the bus operators were not long in discovering that most exasperating delays frequently resulted under this plan, since instead of taking steps to repair a flat tire themselves they were forced to await the pleasure of the manufacturer's representative.

The most reasonable argument advanced by the tire manufacturers against the mileage purchase plan, however, was simply that the actual net cost per mile to the operator in the long run is considerably less when he buys a strictly quality tire and pays for it outright. This is demonstrated as follows: A certain company manufactures a tire the quality of which insures a life of 20,000 miles. A cost-per-mile contract would therefore be figured on this mileage. Since all of the tires not actually defective may be expected to attain this mileage, it is obvious that many of them will considerably exceed it. On the cost-per-mile basis the operating companies do not profit by this excess mileage, while on the outright purchase plan it might be said to be, in common parlance, "gravy" for them. It is thus possible for the manufacturers to demonstrate on the hard bedrock of common sense that both parties to the agreement will benefit under the outright purchase plan.

A representative of one company states:

We believe that outright purchase is preferable because for him who takes care of his tires, extra mileage, lower tire cost and fewer interruptions are his reward. And for him who is indifferent toward his tire service, low mileage, high tire cost and frequent interruptions are the penalty. To our minds, this works out fairly for everyone and such a policy should merit favor as against the plan that works a disadvantage to one or another of the parties involved. Practically all electric railway operators are buying on an outright purchase basis and we believe that they will continue to do so. Of course, outright purchase favors the quality tires as against the others because they will prove to be more trouble free and longer lived, and tires will therefore be judged more strictly on their merits.

When the cost-per-mile plan was first adopted the manufacturers had no reliable information as to tire cost on various types of buses, mileage records for equipment operating over different types of roadway and all of the countless other factors which of necessity enter into the problem. The rates given were, therefore, absurdly low in many cases, at least one contract having been awarded on a cent-per-mile basis. Naturally the producing companies lost a great deal of money in this way, and as more data became available on the aforementioned factors, the rates were materially increased. As opposed to this tendency, however, there was the equally strong inclination to cut prices in order to meet competition and to get desirable business away from rival concerns. The whole situation was therefore one of storm and strife and finally the larger manufacturers singly and as groups agreed that the end did not justify the means and declared themselves against any further sales on this basis.

One of the manufacturers stated:

Only 20 per cent of the companies operating buses in the United States are of a size which would justify our making such a contract with them in any case. Of this 20 per cent, a large number have become convinced that the mileage purchase plan is not the solution of their problem and they are now buying their tires on an outright purchase plan. We, therefore, feel that it scarcely behoves us to violate the dictates of common sense in a wild scramble for what is after all only a comparatively small percentage of the available business in the country. How much better for us to concentrate our efforts on a sane marketing of quality tires on the tried and proved outright purchase plan!

A few manufacturers still offer the cost-per-mile contract to the large operator and some of the largest fleets of buses in this country continue to be equipped under such agreements. Of course, there are two sides to every story and certain operators may have found after a thorough trial of the cost-per-mile plan that it meets their particular requirements in a satisfactory manner. No effort has been made in assembling the opinions contained in this article to get the operator's viewpoint on the question. The manufacturers alone have been consulted. However, it seems significant that the larger producers have deliberately turned their backs on a marketing plan which may be presented in an attractive light to the operating companies.

Manufacturers who still favor this plan necessarily have confidence in the quality of their product, since they can only profit as their tires attain to good mileage figures.

Business Forecasts Optimistic

Authorities See Good Outlook Immediately Ahead, but Are Loath to Attempt Distant Predictions

General business conditions in the United States continue prosperous and there is an encouraging stability in the trend of prices. However, the note of caution which was heard at the beginning of the year is still sounding on the pitch-pipes of commerce. Unprecedented as was last year's record in practically every line of industry, it cannot be safely taken as a guarantee for a continuance of this state of affairs indefinitely. This is the opinion of observers known for their more sober judgment.

The New York Times states:

Tangible evidence of prosperity sometimes points to past, not future, conditions. The basic influence of the 1924 grain harvests was not duplicated in 1925. Our railway traffic and industrial profits depend in large measure on unknown future conditions, notably the crops. In directions where the public's purchasing power has been extraordinary (notably the motor car industry) we have still to discover whether there may not be a saturation point. The capacity and incidental hazards of the country-wide "installment buying" have not yet been tested. As for easy money, such year-end indications as the Reserve Bank rates, the rate on Treasury short-time notes and the 6 per cent for Stock Exchange demand loans (over the year end) suggest that at least the money markets' general trend may have altered.

Broadly speaking, the trend of Stock Exchange prices during January was downward, with several notable exceptions. These were not sufficiently numerous to affect the general averages, however. There does not seem to be any reason to accept this movement as presaging anything more serious than a technical reaction, following advances in many directions which had proceeded too far. This is the opinion of the *Industrial Digest*. As the *Commercial and Financial Chronicle* points out:

Fundamentally the country is prosperous and there are ample funds for all legitimate purposes. If any such thing (as a long-continued downfall) shall come in the future it will be because of definite causes and not because of the mere advance in prices.

None of the accepted authorities, however, seems willing to make definite predictions for more than the first half of the current year. It appears certain that the very momentum of industry which has been built up during past months will carry things forward at a satisfactory rate during

the coming spring and early summer. What will happen beyond that point is apparently a matter for mere conjecture, although very definite occurrences would have to manifest themselves in order to make serious inroads into the nation's industrial health this year.

Babbitt Metal Consumption in December

Total apparent consumption of Babbitt metal in December, based on reports received from 27 firms, was announced by the Department of Commerce to be 5,726,703 lb. as compared with 4,954,683 in November. This consumption is calculated from sales by manufacturers and consumption by those firms (among them several important railroad systems) who consume their own production. In the accompanying table the sales of Babbitt metal are shown separately from the consumption in the producing plants:

	Total Apparent Consumption, Lb.	Sales, (By Manufacturers) Lb.	Consumption, (By Producers) Lb.
1925			
Jan.....	5,683,183	4,620,815	1,062,368
Feb.....	5,164,619	4,103,340	1,061,279
March....	5,644,288	4,395,901	1,248,387
April.....	5,126,416	3,928,136	1,198,280
May.....	5,081,668	4,189,558	892,110
June.....	5,074,966	4,085,125	989,841
July.....	5,184,196	3,694,386	1,489,810
Aug.....	5,441,823	4,068,706	1,373,117
Sept.....	4,621,033	3,579,780	1,041,253
Oct.....	5,550,247	4,169,870	1,380,377
Nov.....	4,954,683	3,534,026	1,420,657
Dec.....	5,726,703	4,758,057	968,646
Total	63,253,825	49,127,700	14,126,125

\$9,101,909 Sales by Brill in 1925— Business Holds Up Well

For the year 1925 the combined output of the four plants of the J. G. Brill Company amounted in sales value to \$9,101,909.

The combined output for each of the past seven years follows:

1919	\$14,210,622
1920	17,537,293
1921	7,647,898
1922	10,177,582
1923	18,167,486
1924	8,721,726
1925	\$9,101,909

After deducting \$560,938 from earnings for all cost of operations, including maintenance and repairs and depreciation, and after setting aside \$82,791 out of earnings reserve for federal income taxes, not yet due, there was a net profit of \$571,269 for the year.

The amount of work on hand on Feb. 1, 1926, was approximately \$4,500,000 compared with \$4,521,000 at this time last year.

In his report covering the year, presented to the stockholders at the annual meeting on Feb. 10, Samuel M. Curwen, president of the company, said that during the past year the company continued the active development of various sizes of gasoline and gas-electric self-propelled cars for steam railroads. The development cost of this new product during the year ended Dec. 31, 1925, was approximately \$350,000, all of which has been charged against the profits for the year. This new branch

Metal, Coal and Material Prices

Metal—New York	Feb. 9, 1926
Copper, electrolytic, cents per lb.....	14.275
Copper, wire base, cents per lb.....	16.00
Lead, cents per lb.....	9.20
Zinc, cents per lb.....	8.25
Tin, Straits, cents per lb.....	63.375
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.....	\$4.875
Somerset mine run, Boston, net tons.....	2.175
Pittsburgh mine run, Pittsburgh, net tons.....	2.05
Franklin, Ill., screenings, Chicago, net tons.....	1.575
Central, Ill., screenings, Chicago, net tons.....	1.125
Kansas screenings, Kansas City, net tons.....	2.35
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.....	\$7.00
Weatherproof wire base, N. Y., cents per lb.....	17.75
Cement, Chicago, net prices, without bags.....	2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.....	11.30
White lead in oil (100-lb. keg), N. Y., cents per lb.....	15.50
Turpentine (bbl. lots), N. Y., per gal.....	\$1.02

of the company's business is increasing. More than fifty-five steam railroads have these cars in operation or on order.

Mr. Curwen on Jan. 8 mailed a letter to all of the stockholders of the company outlining the plan and proposal for the reorganization of the company. On Jan. 13 a sufficient amount of stock had been deposited to make the plan operative and, accordingly, the Brill Corporation has been incorporated under the laws of Delaware.

At a meeting of the board of directors of the J. G. Brill Company held on Jan. 29, W. H. Woodin, president of the American Car & Foundry Company, was elected a director of the J. G. Brill Company to fill the unexpired term of W. H. Heulings, Jr., deceased.

At the meeting of the company on Feb. 10, W. M. Hagar, William Clarke Mason and C. S. Sale were elected directors to serve for three years and W. C. Dickerman was elected a director to serve for one year.

The consolidated profit and loss and earned surplus accounts of the J. G. Brill Company for the year 1925 follows:

Total net sales billed.....	\$9,101,909
Cost of sales, including operating, selling, administration and general expenses, and depreciation for the year, less miscellaneous income	8,447,849
Operating profit	\$654,060
Less estimated federal and state income taxes for 1925.....	82,791
Net profit to earned surplus....	\$571,269
Earned surplus at Dec. 31, 1924	\$4,905,308
Add adjustments (credit).....	1,200
	\$4,906,509
Add profits as above.....	571,269
	\$5,477,778
Less dividends paid:	
Preferred	\$320,600.00
Common	240,510.00
	561,110
Earned surplus at Dec. 31, 1925	\$4,916,668

Fifty New Cars for P.R.T.

Arrangements have been made by the Philadelphia Rapid Transit Company for the purchase of 50 new street cars from the J. G. Brill Company, Philadelphia. Delivery of this equipment will begin in April and end early in June. The cost of the cars will be approximately \$650,000. They are to be of the single-end, center-exit type, many of which are now in service on P.R.T. lines. These cars, together with the 135 buses which have just been ordered by the company, will help to meet the transportation demand which the Sesqui-Centennial Exposition will place upon the transit system.

\$687,560 Expenditures in Minneapolis

Expenditures by the Minneapolis Street Railway, Minneapolis, Minn., totaling \$687,560 in 1926 as recommended by the street railway and bus committee of the City Council and now approved by the Aldermen means that the company will have to finance the difference between that amount and the budget, which was \$568,000 to be taken from earnings. Expenditures will be: For the bus lines, power and mechanical improvements, \$267,000; nine re-rail

and paving projects, \$309,500; special work, \$63,000; bridge work, including some paving, \$11,000; miscellaneous, \$20,000.

As soon as permission has been granted by the Railroad and Warehouse Commission the company will install crosstown bus lines on Lowry Avenue North and 38th Street South and will extend the Bryn Mawr trolley line. Only one long new line is to be built, or extension of the tracks on 42d Street. One of the large paving contracts will be on Nicollet Avenue.

Rolling Stock

Dallas Railway, Dallas, Tex., if the Council approves the suggestion of the city's supervisor of utilities with respect to fares, will put through a program calling for the expenditure of about \$1,000,000, an important item of which will be an appropriation for the purchase of 30 Peter Witt cars.

Pennsylvania Railroad System is building eight all-steel multiple-unit cars for suburban service on its various lines. The cars are under construction at the company's Altoona works.

Seattle, Wash.—The City Council recently passed unanimously an ordinance providing for the purchase of fourteen buses, ten to be used in the North End and the others in relief work on lines already established. The ordinance authorizes the issuance of \$100,000 in railway department warrants to pay for the new buses.

Track and Line

Trenton & Mercer County Traction Corporation, Trenton, N. J., will install double-track corners at Princeton and Paul Avenues and Princeton and East Paul Avenues.

Northern Ohio Traction & Light Company, Akron, Ohio, did a considerable amount of track construction work during 1925. Right of way was secured from the Wheeling & Lake Erie Railroad for approximately 5 miles and new track was constructed. In Ravenna approximately 1,000 ft. of open track was replaced with heavy T-rail. In Barberton the single track on High Street for a distance of approximately 5,200 ft. has been replaced with double track. In New Philadelphia it was necessary, due to city repaving, to renew approximately 3,000 ft. of single track. In addition to much new construction the company had a very extensive maintenance program. In Bedford repairs were made to the paving on Broadway and approximately 35,000 ties were renewed. Worn-out rails on various curves were renewed. In Akron and Canton especially considerable trackwork was accomplished.

Los Angeles Railway, Los Angeles, Cal., has started the construction of a car track through the North Broadway tunnel. The job was made necessary by the construction of the city hall and civic center in the North Spring Street district. The Broadway tunnel job was authorized recently by the city. It will cost \$70,000.

Trade Notes

Griscom-Russell Company, New York, N. Y., announces the removal of its general offices from 90 West Street, New York, N. Y., to the new Murray Hill Building, 285 Madison Avenue.

Universal Metal Box & Products Company, Inc., Newark, N. J., manufacturer of externally operated switches, safety switches, metal cut-out boxes, fuse boxes, electric signs, stair tread lights, etc., has announced the appointment of the Fred Rowell Company, Inc., New York City, as its sales agent in the metropolitan district, including northern New Jersey.

Timken Roller Bearing Company has promoted R. C. Brower to the position of assistant to H. J. Porter, vice-president in charge of sales. Mr. Brower became associated with the Timken Company in 1916, as district manager of the Bearings Service Company, with offices in Detroit. At the dissolution of this company, in 1922, the Timken Roller Bearing Service & Sales Company was organized. He then went to Canton, the headquarters of the new company, as assistant general manager. This position he held until his present promotion. The present offices will be maintained at Canton.

G. L. Hulben has been added to the sales force of the Chicago branch of the Ludlum Steel Company, Watervliet, N. Y. For years Mr. Hulben has been connected with the Chicago sales division of a large tool steel manufacturer.

Southern Wheel Company, Pittsburgh, Pa., has opened a new office in Washington, D. C., at 818-819 Munsey Building. This office will be in charge of F. C. Watkins, special representative, who has been moved from Atlanta, Ga. The Atlanta office, at 1413 Candler Building, will be in charge of C. C. Cox.

Advertising Literature

Westinghouse Electric & Manufacturing Company has issued a 112-page publication, describing the proper switching equipment for alternating-current power stations. This special publication, 1541-C, deals with the fundamentals to be borne in mind when laying out a switchboard, and describes in detail the various types of switching equipment. It is illustrated with diagrams and halftones.

Sullivan Machinery Company, Chicago, Ill., has issued bulletin 81-I, featuring two new types of Sullivan concrete breakers. These are DW-221, a 75-lb. heavy-duty buster, and DP-221, a 48-lb. light buster for concrete breaking in street openings, demolition work of many kinds, etc. The term "buster" has just been registered as a trademark to designate this type of tool. "Speed Up with Air" is the title of another bulletin of sixteen pages, which illustrates Sullivan portable air compressors and shows many applications of Sullivan rotators, hammer drills, clay spaders, concrete breakers, portable hoists, etc. Tables of capacities and specifications are given.



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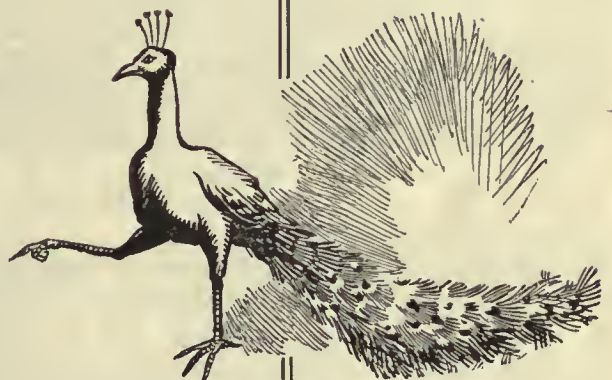
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DETECTIVES131 State St.
BOSTON

When writing the advertiser for information or
prices, a mention of the Electric Railway
Journal would be appreciated.

J. ROWLAND BIBBINS

Engineer—2301 Connecticut Ave., N.W., Washington, D. C.

TRANSPORTATION SURVEYS

Organized Traffic Relief and Transit Development
Co-ordinating Motor Transport, Railroad and City
Plans, Service, Routing, Valuation, Economic Studies
EXPERIENCE IN 20 CITIES

Big Results from Little Ads

The advertisements in the Searchlight Section are constantly
bringing together those who buy, sell, rent or exchange.

They convert idle commodities into useful cash, idle cash into
useful commodities, and that which you have but don't want
into that which you want but don't have.

The cost is a trifle, the results considerable.

0059

Get Your Wants into the Searchlight**ROOT**Life Guards
Snow Scrapers

Remove Snow as it falls—with Root Scrapers.

Root Spring Scraper Co.

Kalamazoo, Mich.

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill
differ only in magnitude; small orders command out utmost care
and skill just as do large orders. CAMERON quality applies to
every coil or segment that we can make, as well as to every
commutator we built. That's why so many electric railway men
rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

**MOHAWKS***Go
Farther!*

A sturdy dependable carefully made tire that
will actually yield from thirty to fifty per cent
more mileage than the so-called standard grade
tires. Ask your nearest Mohawk dealer to
prove this statement to you.

THE MOHAWK RUBBER COMPANY

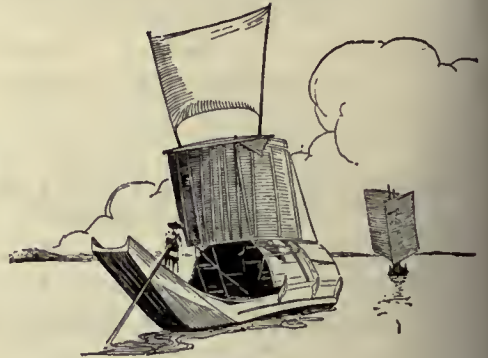
Factory: Akron, Ohio. Export Dept.: 243 W. 35th St.,
New York, N. Y. Cable address: "Mohawk" New York

Transportation—The Whole World Around

FOURTH SERIES



From "Greenland's Icy Mountains to India's Coral Strands" is a famous line in an old hymn; but this outfit coming South—"dog-tired" from Etah—may never have the aid of India Tires. We do well among American Truck and Bus operators, but our exports to Greenland aren't much.

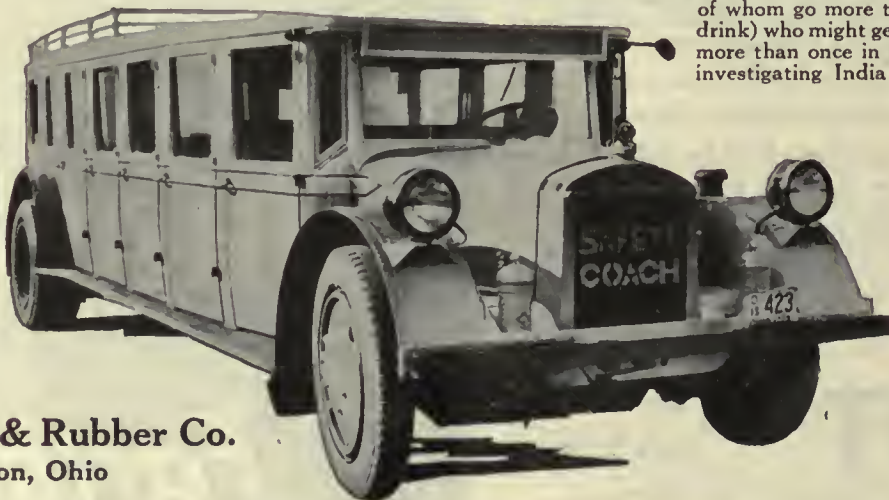


Barrel-Sails of Matting manage to make a speedy proposition out of this awkward and cumbersome looking boat on the Chinese river "Han"—but to speed up the trucks and busses of America it takes uninterrupted tire service, the kind that the India Tire is famous for.

Rapid Transit at Luxor—with the aid of a crutch. Like this "luxurious" limousine by the Nile, some American truck owners are using crutches but don't know it—for tires that fail to meet India's road performance are just as unsatisfactory as crutches.



The Camels of Nazareth get a "hump on themselves"—but only once in a lifetime. Without wishing to seem impertinent, we'd like to suggest that there are some business men in this country (some of whom go more than eight days without a drink) who might get a "hump on themselves" more than once in a lifetime. Why put off investigating India Tires? Do it today!



India Tire & Rubber Co.
Akron, Ohio



INDIA TIRES

With the Gum-Weld Cushion



Ruggedly built, yet handsome in appearance, embodying the latest development in motive power with the best elements of

*Features of the
Cummings
Gas-Electric Coach:*

Inviting appearance—low entrance step, broad aisle, leather seats, narrow metal sash, wide windows, abundant lighting, ample head room, smooth, comfortable riding.

*Gas-Electric
Features:*

Smooth, rapid acceleration.
Start to full speed with foot control.
Higher schedule speeds—more trips.
Absence of vibration.
No clutch or shifting gears with accompanying shocks.
Greater riding comfort.
No driver fatigue.
Greater safety.
Minimum depreciation.
Minimum maintenance.

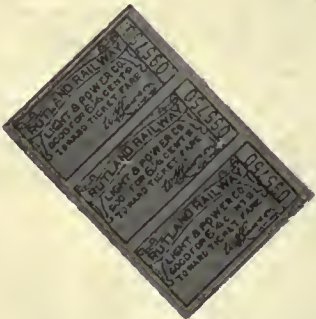
body construction resulting from twenty-five years of street car building—
The Cummings Gas-Electric Motor Coach.

Cummings Car and Coach Co.

Successors to McGuire-Cummings Mfg. Co.

111 West Monroe St., Chicago, Ill.

Lightweight City and Interurban Cars and Trucks



Speeding up service

To Speed up service—
and yet maintain ac-
curacy of collections—
is a problem well solved
by the use of

GLOBE

Tickets--Transfers--Passes

Designed by specialists for
all standard and special re-
quirements. Ask for further
particulars and samples of
our work.

GLOBE TICKET COMPANY

116 N. 12th Street, Philadelphia, Pa.

Los Angeles

New York

San Francisco



Moran Patent Transfer



Low Operating Cost
Plus
High Loading Factor

Equals
Profitable Operation

Transportation experts now generally agree that the 21-passenger Motor Coach is the most profitable unit for co-ordination with street car service. This well balanced, attractive unit reduces the percentage of unoccupied seats to the minimum.

Graham Brothers Motor Coaches are proving remarkably economical in operating cost. Skillful design and generous use of alloy steels eliminate excess dead weight and result in a rugged and thoroughly dependable transportation medium.

Street Car Type
 Motor Coach,
 Complete,

\$3815

F. O. B. Detroit

GRAHAM BROTHERS

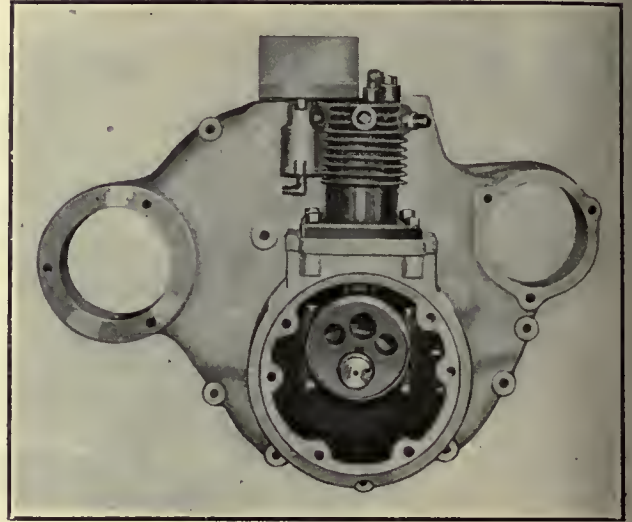
Evansville - DETROIT - Stockholm
 A DIVISION OF DODGE BROTHERS INC
 GRAHAM BROTHERS (CANADA) LIMITED - TORONTO, ONTARIO

GRAHAM BROTHERS
MOTOR COACHES

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

Front-end mounted Christensen compressor as applied to the engines used in White Models 50A and 50B busses.

This unit can be mounted upon your present White busses or obtained on new equipment upon specification.



Front-end mounting developed by Christensen
(patents pending)

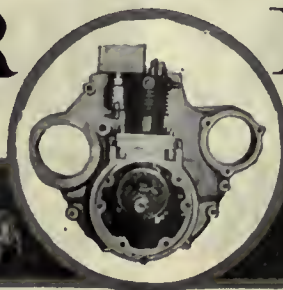
Specify Christensen because---

- the Christensen compressor is mounted on the front-end cover plate and driven directly from the main engine crankshaft.
- gears, driving chains, auxiliary shafts, and universal joints are eliminated.
- it has less than half the parts of any two-cylinder compressor.
- maintenance is low.
- 300 pounds pressure can be delivered in regular service, a tremendous excess over operating requirements.
- the automatic governor, controlling maximum and minimum pressures, relieves the compressor from working against pressure except when needed.
- air and oil cooling absolutely prevents overheating.

If you operate busses, or contemplate their operation, you should be thoroughly familiar with the details of design and construction that make possible the above results. Send for the booklet "The Christensen Compressor for Automotive Air Brakes."

Christensen

AIR
CHRISTENSEN
6513 Cedar Ave.



BRAKES
AIR BRAKE CO.,
Cleveland, Ohio





International Harvester

COACHES, AT DAVIS ISLANDS, TAMPA

At Davis Islands, \$30,000,000 development de luxe which has risen out of the waters of Tampa Bay, a fleet of 6-cylinder Internationals has for many months been displaying the qualities that distinguish International Motor Coaches everywhere.

In mechanical design; in comfort and safety; in beauty of line and perfection

of appointments, these conveyances merit your close attention.

SERVICE is of equal value here. International service is delivered to International automotive customers through 112 branch houses — largest Company-owned truck and coach service organization in the world.

Complete information on request.

INTERNATIONAL HARVESTER COMPANY
606 S. Michigan Ave. of America Chicago, Ill.
(Incorporated)



Illustrations above and below—Davis Islands' 33-passenger, 6-cylinder Internationals. International also provides sturdy, economical 4-cylinder coaches on underslung chassis. Very popular for school use, golf clubs, suburban routes, station service, as auxiliaries to bigger coaches, and for a variety of other passenger transport requirements.



*30 minutes after
a coat of DUCO
has been spray-
ed on a car it is
ready for the
next coat.
This is only one
of the reasons
why DUCO doubles
the output of a
finishing shop.*

Du Pont finishing engineers will be glad to furnish further information about DUCO, and estimate the annual savings you can accomplish by using it.

E. I. du Pont de Nemours & Co., Inc., Chemical Products Division, Parlin, N. J., Chicago, San Francisco . . . Canadian Distributors: Flint Paint and Varnish Limited, Toronto, Canada.



REG. U.S. PAT. OFF.

There is only ONE Duco — DU PONT Duco

White Bus Chassis Model 50-B

THE White Bus Chassis Model 50-B is introduced to meet the changing conditions of passenger transportation.

Embodied in the Model 50-B Bus Chassis are a number of improvements and refinements including—

Westinghouse Air Brakes—

The installation of this type of air brake on rear axle makes it possible to use metal to metal friction surfaces which is the most effective way of dissipating the heat which accompanies severe braking. Insures effective brake control under all conditions and long life for brake liners.

An Improved Motor—

Various mechanical refinements have been made in the engine improving flexibility and smoothness of operation.

Improved Oiling System—

Oil pump capacity is increased to insure plentiful supply of oil to all parts of engine. Large area of fine mesh wire screen removes all dirt particles providing clean oil supply at all times.

Larger Tires—

Tire equipment consists of 34 x 7 pneumatic tires, duals in rear.

Improved Rear Axle—

Double bearings of taper roller type at wheel ends of spindles, with other refinements, designed to meet the most severe conditions of operation.

Stronger Frame—

The 10 inch frame with gusseted cross members provides ample strength and rigidity under all operating conditions.

Improved Radiator—

Heavy cast aluminum shell with removable core. Supported by new design of spherical seat and retained by springs in neat housings above radiator brackets.

Easier Steering—

New and sturdy design of steering gear makes easy steering.

Transmission—

Speed ratios specially adapted to bus operation.

The White Model 50-B Bus Chassis is built with the optional wheelbases of 198 or 230 inches to accommodate bodies seating from 25 to 29 passengers.

Write for full specifications and a booklet of facts about actual White Bus operations. We shall be glad to send them free.

THE WHITE COMPANY, *Cleveland*

WHITE BUSES

MADE RIGHT — SOLD RIGHT — KEPT RIGHT



Cincinnati Georgetown & Portsmouth R.R. Near Coney Island
Race Track — Cincinnati, O.
International Poles

2¢6

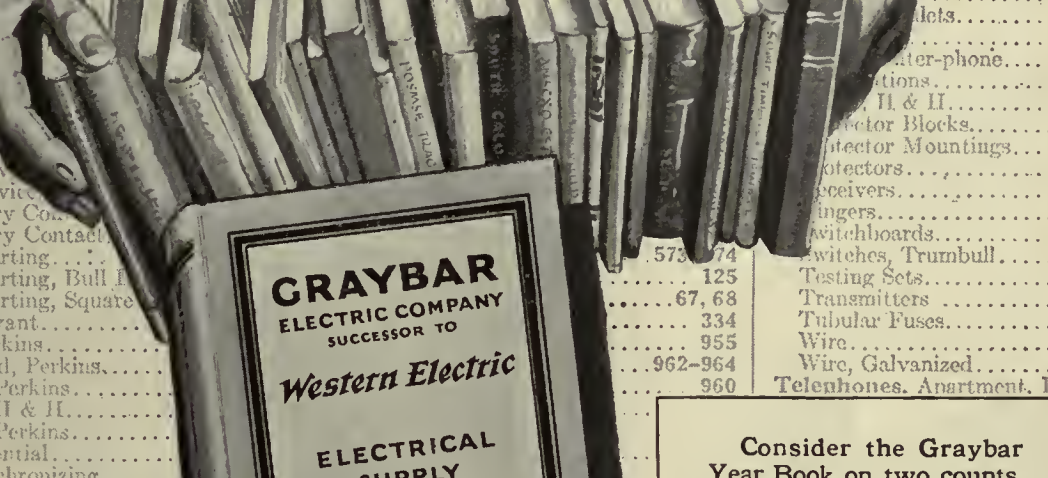
Pine is the Strongest of Pole Woods

WE have said it before and we say it again. We say this with full knowledge of the facts based on comparative tests and on Government figures. We say also that the greatest permanent line strength is assured by the use of *International* Creosoted Pine Poles—because the great natural strength of pine is made permanent by the uniform and deep penetration of high grade creosote oil.

Lower cost per year—lower maintenance cost—and greatest protection against storm damage result from the use of these poles.

INTERNATIONAL CREOSOTING & CONSTRUCTION CO.
Galveston—Texarkana—Beaumont

International
PRESSURE CREOSOTED
YELLOW PINE POLES



Dozens of catalogs in one
—for your convenience

How many catalogs do you use in a year for ordering electrical material? Here are dozens of them in one—the Graybar Year Book.

It lists everything electrical. It is indexed for quick reference to any desired article. It covers over 60,000 items.

Start 1926 right with the new Graybar Year Book—just out. For your immediate convenience—here's a memo.

Consider the Graybar Year Book on two counts.

1. As a quick means of locating anything electrical.
2. As an assurance of quality-reputation on over 60,000 items.

Graybar
ELECTRIC COMPANY
SUCCESSOR TO
Western Electric

Send for it
TODAY
Please send me Graybar Year Book

Graybar
ELECTRIC COMPANY
SUCCESSOR TO
Western Electric

OFFICES IN 55 PRINCIPAL CITIES.
Address nearest office or
100 E. 42nd St., New York

Graybar
ELECTRIC COMPANY
SUCCESSOR TO
Western Electric

Western Electric



Tracks of the People's Railway Company, on North Jefferson Street, Dayton, Ohio. Dayton Resilient Ties were installed in 1917. The photograph was taken in 1924. Note particularly the absence of any signs of joint repair.

The Dayton Mechanical Tie Co.
Dayton, Ohio



The Dayton Mechanical
DAYTON,

SEVEN YEARS

The track and joints are
as smooth and solid as when new

The photograph bears testimony to the lasting qualities of track laid on Dayton Resilient Ties.

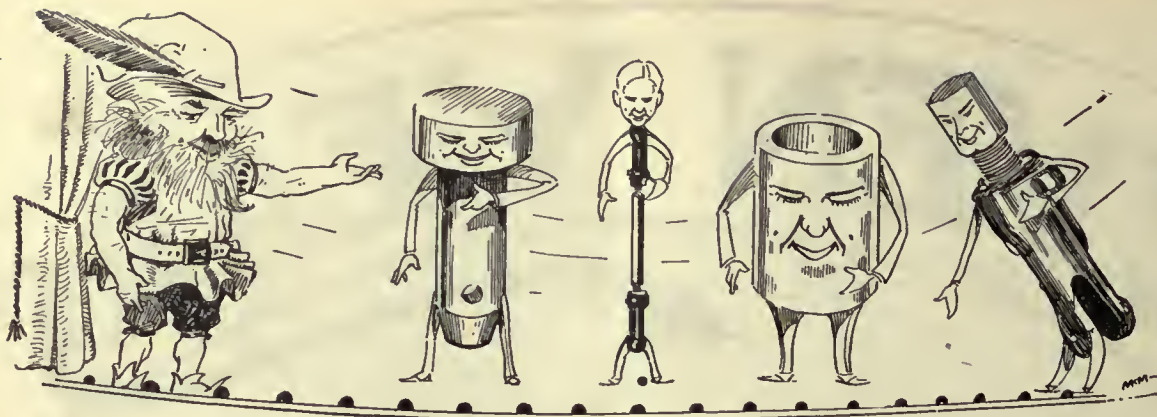
The wood block and asphalt cushion construction of the Dayton Tie has demonstrated its ability to absorb the vibrations and blows of traffic throughout many years and protect the track foundation.

Although the surface of the paving is beginning to show the years of wear, the track itself and the foundation are still smooth and quiet, even at the joints.

As usual Dayton Tie track has proven the most profitable track investment.

*Construction details
and cost data will be
furnished upon request.*





Taking the "steenth" encore

When an act is called out time after time for encores, you can bet your bottom dollar the show is a success. In fact many managers rate their acts according to the amount of applause received.

In the same way constant repeat orders are visible evidence that the product is "making good." On this basis Boyerized Parts stand "ace high" in railway service. For these companies find that the special Boyerizing treatment gives car parts three to four times the life of ordinary untreated steel parts.

Pick out the parts you need — then send for quotations.



**The
McArthur
Turnbuckle**

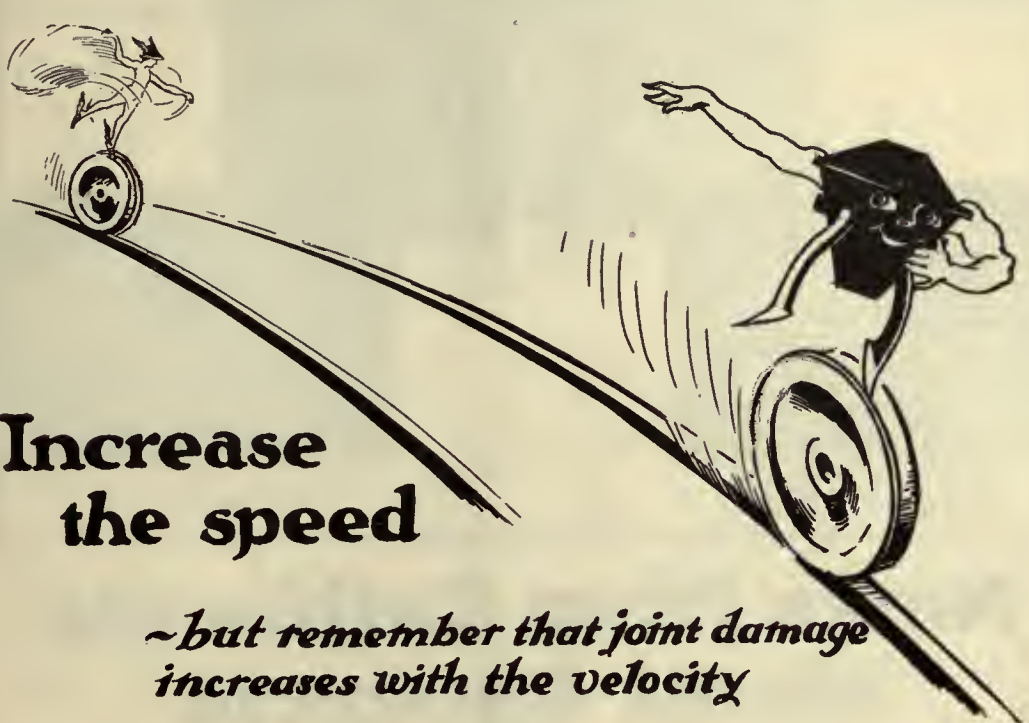
Brake Pins	Spring Post Bushings
Brake Hangers	Spring Posts
Brake Levers	Bolster and Transom Chafing Plates
Pedestal Gibs	Manganese Brake Heads
Brake Fulcrums	Manganese Truck Parts
Center Bearings	Bushings
Side Bearings	Bronze Bearings

Bemis Car Truck Company

Electric Railway Supplies
Springfield, Mass.

Representatives:

Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 54 First Street, Portland, Ore.
L. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.



Increase the speed

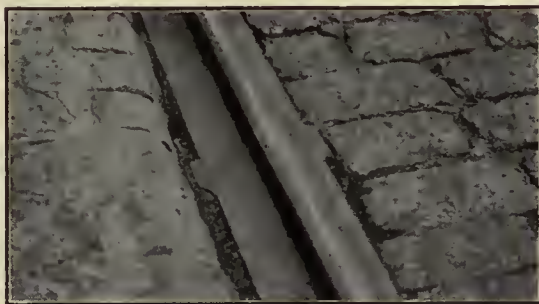
*~but remember that joint damage
increases with the velocity*

SOME people say it increases as the square of the velocity! In any case, we all know that running a car over bad joints at high speed, accelerates the destruction of the joint, and soon ruins the car itself. The slightest irregularity at the joint is quickly magnified.

Yet every ideal of modern and improved

transportation calls for speed, and still more speed. The swift automobile is a spur to the railway which cannot be ignored.

Thermit-welding eliminates the joints, so that rails form one smooth, continuous track, without a break or bump.



A Thermit Rail Weld made over 6 years ago in Grand Street, Jersey City, N. J.

Look at this illustration! A car wheel at any speed, cannot bump or pound where there is no joint. The joints in this track disappeared for good five years ago—when they were Thermit-welded.



METAL & THERMIT CORPORATION

120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH

CHICAGO

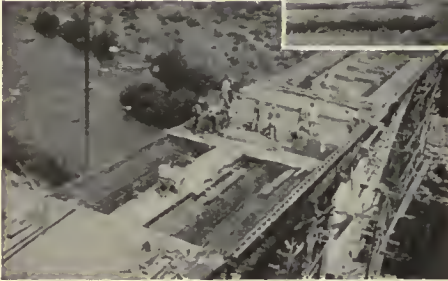
BOSTON

SOUTH SAN FRANCISCO

TORONTO



Humboldt County
Van Duzen River Bridge
View looking North.



Construction Work — Bridge across
Truckee River and S.P.R.R. tracks lo-
cated in Nevada County, near Polaris.



Bridge over North Fork Pacheco Creek.
Located in Santa Clara County.

News from California about Concrete

Field control of concrete quality is now standard practice of the California State Highway Department.

During the last year and a half fifty bridges in various parts of the state have been built strictly in accordance with this practice.

Recognition has been given the principle that the most important factor in obtaining concrete of uniform strength is *control of the water ratio*.

In designing the proper mix for this control, aggregates have been graded by sieve analysis; proportions have been accurately determined by fineness modulus.

Then as a check on the consistency of the concrete, slump tests were made at regular intervals.

Finally, strengths on all jobs were verified by testing field cylinders made of concrete as it came from the mixer.

Results of these tests prove—as similar tests have proved on many other jobs throughout the country—that field control insures uniformly better concrete.

Write today for a copy of "Design and Control of Concrete Mixtures." Address the nearest office listed below. There is no obligation.

PORTLAND CEMENT ASSOCIATION

A National Organization to Improve and Extend the Uses of Concrete

ATLANTA	DALLAS	KANSAS CITY	NEW YORK	SALT LAKE CITY
BIRMINGHAM	DENVER	LOS ANGELES	OKLAHOMA CITY	SAN FRANCISCO
BOSTON	DES MOINES	MILWAUKEE	PARKERSBURG	SEATTLE
CHARLOTTE, N. C.	DETROIT	MINNEAPOLIS	PHILADELPHIA	ST. LOUIS
CHICAGO	INDIANAPOLIS	NASHVILLE	PITTSBURGH	VANCOUVER, B. C.
COLUMBUS	JACKSONVILLE	NEW ORLEANS	PORTLAND, ORE.	WASHINGTON, D. C.



Grand Rapids 27 cars-

... ingers, cr
... 01 in. apst. E
... led to the adoption of
... front end. This construction
... ped, was co... to be most convenient and comfortable
... average. for boarding passengers, since it permits the first step

Specifications and General Dimensions of the Grand Rapid Cars

27	Heaters	 Railway Utility truss plank	Warning horn	 Bosch 6-8 volt
	Headlights	 Two Crouse-Hinds or equal at front end	Wheels	 Davis one-wear
		 Haskelite		
	Interior finish	 Mahogany		
	Interior hardware	 Aluminum		
	Interior illumination	 Five brasses		
	Passenger signals	 E-25411, 12-in. dome center		
	Roof	 Arch		
	Roof covering	 Semi-Suede		
	Sash fixtures	 Curtilly locks and		
	Seats	 O...wards balances		
	Seating material	 Kemi-Sure		
	Black adjuster	 Vestinghouse Form E		
	Safety device	 Railway Car Devices Company		
	Step treads	 Oakelite		
	Stop-light	 Porcelain enamel		
	Street indicator	 Electra Voice loud		
	Tr... signals	 Consolidated single		
	Tr... catchers	 Ohio Brass		
	base	 Ohio Brass		
	wheels	 More-Jones		
	Thermostat	 Railway Utility type 6-A		
	Exhaustors	 Peerless, Railway Utility or equal		

Specifications

..... Four OE-264P, 15 hp.	Motors
..... K-35KK, single end	Control
..... Westinghouse	Air brakes
..... G.E. C. P. 27	Compressor
..... Anti-Freaser	Anti-freeze device
..... 4 in.	Asies
..... Plymell	Body side panels
..... Celotex	Body insulation
..... Automobile type	Bumpers
..... St. Louis Car Company	Back-up device
..... National Lock Washer	Curtain fixtures
..... Double-faced Panatote	Curtain material
..... Keystone or equal	Destination signs
..... National Pneumatic	Door-operating equipment
..... Economy meter	Energy-saving device
..... Krakno enamel	Exterior finish
..... Woods	Face boxes
..... N. B. life-guard	Fenders
..... Celetes and rubber til	Floor

Gears and pinions
..... General Electric long and short addenda
Gong
..... Keystone 12-in. pneu
Hand brakes, Pascock stainless with
..... aluminum

Reproduced from Electric Railway Journal, December 26, 1925

DAVIS "One-Wear" WHEELS

Grand Rapids has chosen — and the entire railway field notes with interest the outcome of the unique experiments with modern electric railway equipment.

The unchallenged economy, and the sound principles of design embodied in Davis One-Wear Steel Wheels have led to their choice as part of the modern car.

AMERICAN STEEL FOUNDRIES
NEW YORK CHICAGO ST. LOUIS



Collier Service

A nation-wide
organization
building and
sustaining car
card advertising
space values



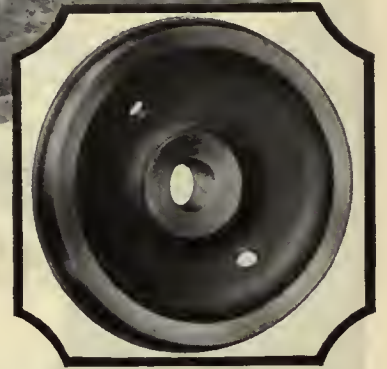
Barron G. Collier, Inc.

Candler Bldg.
New York



Birds-Eye View of
Cambria Wheel Plant

Forged *then* Rolled —to Give Longer Life



Cambria Wheels are made by a combined forging and rolling process which gives them great durability and an exceptionally long life.

The forging process gives strength, toughness and density to the metal, while the rolling establishes a grained

structure which prevents breakage and crystallization.

Long experience in the manufacture of wheels and control over materials assure you of a product of the highest quality and finest-workmanship.

Cambria Forged Car Axles



Cambria Car Axles are made of the same fine quality as Cambria Wheels and can be furnished smooth forged or rough turned all over; solid or hollow bored; rough turned on journals and wheel seats; heat treated or untreated.

A Few Bethlehem Railway Products

for Electric Railways include Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

DISTRICT OFFICES

New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh
Buffalo Cleveland Detroit Cincinnati Chicago St. Louis San Francisco Seattle Los Angeles
Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

BETHLEHEM

CAMBRIA CAR WHEELS AND AXLES

Annual Maintenance Number

Railways Plan to Spend \$296,000,000 for Plant and Material in 1926

Purchasing Power of the Industry Shows Healthy Progress—An Increase of 11.66 per Cent Over Last Year's Figures Is Promised—Large Track Construction Program Is Included in Forecast Submitted by the 57 Operating Companies Furnishing Information

1926

ELECTRIC RAILWAY JOURNAL

34 per Cent of Passenger Cars Are Over Twenty Years Old

Less than Half of All Cars Now in Electric Railway Service Were Purchased in the Last Fifteen Years—Greater Number of New Cars Are Needed to Modernize Industry than Was Anticipated—Nationwide Survey More than Confirms Previous Estimates

more

Track Extensions Show Substantial Gain Over Previous Years

Electric Railway Mileage Added During Past Twelve Months Is Larger than in Any Other Year Since 1918—Extensions to City and Interurban Trackage Show Increases Over 1924 — More than Twice as Much Steam Railroad Mileage Was Electrified

ELECTRIC RAILWAY JOURNAL

Bus Operation by Electric Railways Broke All Records in 1925

More Companies Inaugurated Bus Service During the Past Twelvemonth than in Any Previous Year—The Number of Buses Operated More than Doubled—Purchases of New Passenger and Service Equipment Were Greater than Ever Before

Electrification Costs and Mileage in 1925

Occurred in Major Incidents—Only Trends Indicate Duration Method of Comparison—S. Richey, Engineer, Worcester, Mass.

ELECTRIC RAILWAY JOURNAL

Membership

Few in Receivership—More than 100 Over That on the List

—to be dated March 20, 1926

From the Industry's Headlines—learn a lesson!

A REMARKABLE opportunity for the manufacturers of railway equipment and supplies is revealed by the data published in the January 2nd Statistical Issue of **ELECTRIC RAILWAY JOURNAL**. A few of the strikingly suggestive facts are indicated in the headlines reproduced here.

The definitely-indicated movement toward modernization of rolling stock, brings with it the problems of modernizing maintenance, to the end that riders, attracted by new cars, may be retained as permanent patrons. Only by keeping cars, track and line in the pink of condition can a present-day public be kept "sold" on the electric railway as a means of transportation.

It is to the further exposition of this timely subject, that the big Annual Maintenance Number of **ELECTRIC RAILWAY JOURNAL** will be dedicated. The producer and distributor of electric railway equipment, supplies, maintenance materials and shop machinery, represented in this issue will derive enhanced value from ample advertising space, due to this tie-in with a timely and appropriate editorial program.

ELECTRIC RAILWAY JOURNAL

(A McGraw-Hill Publication)

Tenth Avenue at 36th Street

New York, N. Y.

Member ABC

Member ABP

1926

ELECTRIC RAILWAY JOURNAL

Car Purchases During 1925 Were Below Requirements

Reduction in the Number of New Cars Ordered This Year Emphasizes the Importance of Directing Increased Attention to Replacement of Obsolete Equipment—New England Was the Only Section Reporting Increased Purchases Over Last Year

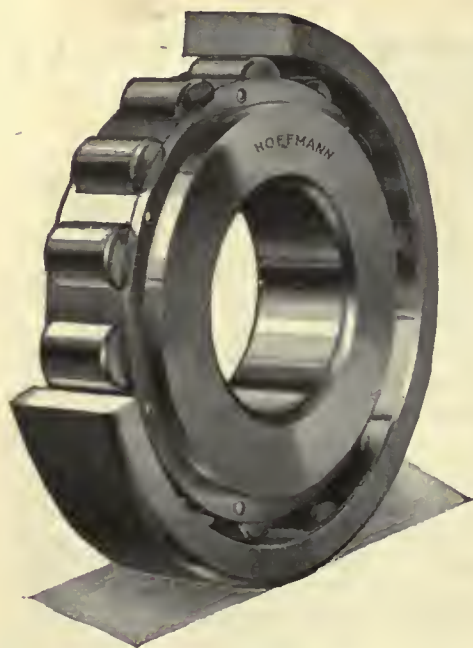
in 1925

the Failure of One Large Property
red to Their Owners, While
Early This Year

purchases

NEW RAILROAD STOCK ORDER

RUGGED SIMPLICITY



Cylindrical rollers, cylindrical races, full-line contact of each roller on races, always—a sturdy balanced cage—this is the utter simplicity of the “Hoffmann” Precision Roller Bearing. Initial precision indefinitely maintained under hardest service, makes “adjustability” unnecessary. Hardened and heat-treated alloy steels make wear negligible.

On heavy-duty bearing problems,
let our engineers work with you.
And send for Catalog 904.

**NORMA-HOFFMANN
BEARINGS CORPORATION**

Stamford — Connecticut

PRECISION BALL, ROLLER AND THRUST BEARINGS

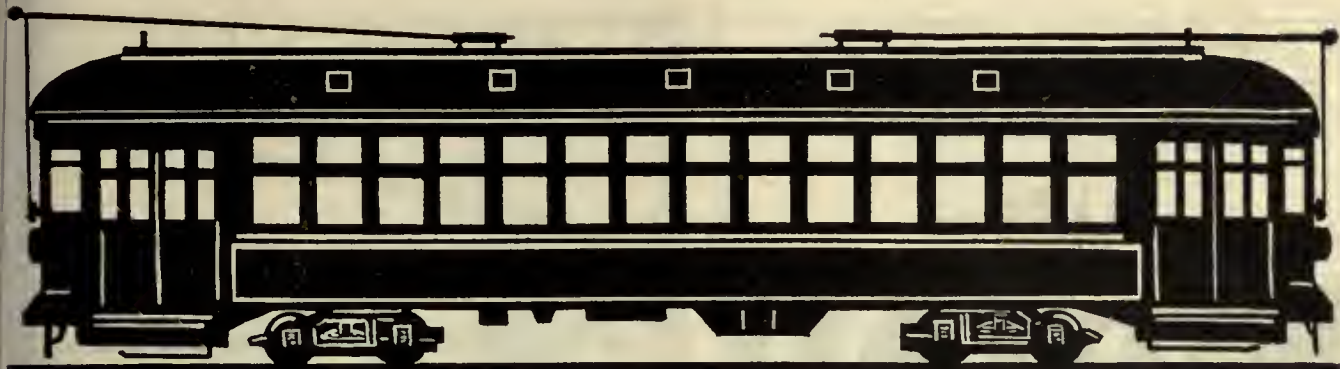
“HOFFMANN”

**IRVING
SAFKAR** **STEP**
TRADE MARK

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y. U.S.A.

DAMAGES paid for one car step accident may cost you more than a complete equipment of permanently non-slipping “SAFKAR” Car Steps for every car on your system. They’re lighter in weight than other steps, too—a big saving in dead load. And maintenance costs upon them are negligible.

Write for Catalog 4A28.



Service represents one of the reasons why electric railways in steadily increasing numbers are using Gary Wrought Steel Wheels. Central plant location assures prompt delivery after shipment. Long association with railroad requirements guarantees intelligent and painstaking handling of orders.

Of themselves, these considerations would be insufficient, perhaps, to be of deciding influence. Added, however, to the manner in which the quality of Gary Steel Wheels is guarded from ore mine to finished product, they help to explain the favor that Gary Wheels enjoy.

Illinois Steel Company

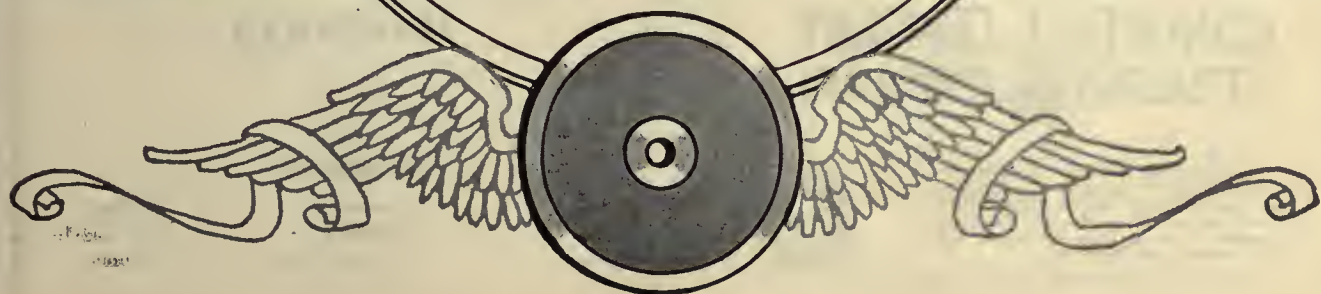
General Offices: 208 So. La Salle St.
Chicago, Illinois

GARY

WROUGHT

STEEL

WHEELS



Save the motors
use

Nuttall

Standard Helical Gears



That shock of acceleration that is inevitable with spur gearing. Springs bolts, strains bearings, loosens insulation, cuts gear life and motor life, and piles up maintenance.

The motors suffer; body work suffers and soon begins to creak.

Nuttall BP Helical Gears will stop this profit leak. The meshing of the teeth is like the turning of a screw — smooth, vibrationless, noiseless, shockless. There is no grinding and no chattering.

We'll be glad to cooperate in *proving* their economy on your cars. Consult us.

Write for our Helical Gear Book

R.D. NUTTALL COMPANY
PITTSBURGH  PENNSYLVANIA

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They talk for themselves

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KUBEE

It is hard for the long-skirted fundamentalist to understand that modesty can exist where clothes do not.

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We have authority to speak only in the matter of carbon brushes (Morganite brushes to be specific) and in that line we consider it perfectly modest to strip brush selling of all its frills and furbelows and get right down to the naked truth, and to talk very frankly and openly about it.

Just mention this matter to any of the men in the list below — they like to talk this way.

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Brush Co., Inc.

Main Office and Factory
519 West 39th St., New York

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Cincinnati, Electrical Engineering & Mfg. Co.,
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Revere, Mass., J. F. Drummey, 75 Pleasant Street.

Los Angeles, Special Service Sales Co., 502 Delta Building.

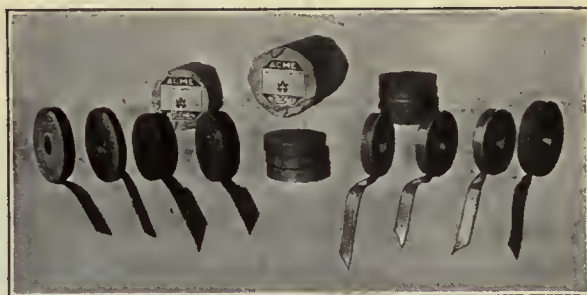
San Francisco, Special Service Sales Co., 202 Russ Building.

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BIAS CAMBRIC TAPES FOR SHOP USE

The man in the shop is the best judge of tapes. We make them to suit him. In the Sewed Bias Tape, the stitching is finer and the butted seam thinner. We need only 48 seams in a 72-yard roll. Some tapes have as many as 55!

The Acme sewed seams are so thin they do not need to be cut out. Acme Seamless Bias Tape comes in any width and in thicknesses from .007 in. to .015 in.; rolls of 72 yards all one piece of cloth, or special length rolls where required.

Acme Varnished Cambric Tapes are made in either yellow or black, and with dry, tacky or greasy finish.

Ask for Catalog 3J

It contains tables and complete data on Varnished Insulations.

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"Tool Steel"
helical gears

are

Quiet on the start
and

Continue Quiet
because

They don't wear.

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**MORE-JONES
QUALITY PRODUCTS**



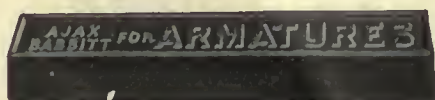
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Not if you use

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BABBITT for ARMATURES

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Special Trackwork
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Lowest Cost
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Its wearing qualities are unsurpassed.

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Black and Yellow
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Wires, Cables, Cable Accessories
Superior quality, economical prices
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WELDING CABLE

ELECTRICAL WIRES and CABLES

John A. Roebling's Sons Company, Trenton, N. J.

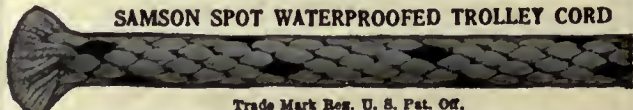
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Made of extra quality stock firmly braided and smoothly finished.
Carefully inspected and guaranteed free from flaws.
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AS supervisor of welding, grinding and bonding. Nine years' experience both as traveling demonstrator, and in supervising joint and surface welding, grinding, bonding, shop-welding and apparatus repairs on both city and interurban properties. Can guarantee to get highest results in economy and performance. Location immaterial. Available about April 15. PW-883, Electric Railway Journal, Tenth Ave. at 36th St., New York.

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ENGINEER, 24 years' experience in electric railway rolling stock maintenance and transportation supervision, open for position. PW-879, Electric Railway Journal, Tenth Ave. at 36th St., New York.

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Rails WeBuy and Sell
entire equipment
of Electric Rail-
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ing, Conduits, Etc.

Get Our Bids or Ask
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TO HELP YOU

LOCATE BUSINESS OPPORTUNITIES

"Searchlight" Advertising

G-6

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Every car in first-class operating condition. Built by Cincinnati Car Company. Length over all, 47 ft. 6 in. Height over trolley board, 12 ft. 6 1/4 in. Height over all, 13 ft. 1 1/4 in. Number of seats, 15 across, 4 long. Type of motors, four G.E.-204. Make of trucks, Standard. Wheel base, 6 ft. 6 in. Controller K-34-D. Toilet, 29 in. x 34 in. Air Compressor, WH-D-3. These cars good for one or two man operation. See our advertisement in the Jan. 30th issue of this publication for illustration of these cars. Write for further particulars.

We also have some 56-passenger cars of this type, as offered in our advertisement of January 2nd.

J. W. GERKE, Railway Equipment
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30 Birney Safety Cars

Brill Built

West. 508 or G. E. 284 Motors. Cars Com-
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ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

If there is anything you want—

or something you don't want that *other* readers of this paper can supply—or use—advertise in the



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fications for a particular position—that man may be another reader of this paper!

Put the Searchlight Section to work for you under any of the following classifications—to fill your business needs.

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Etc., Etc., Etc.

"Searchlight" is the "Opportunity"

advertising of this industry.

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Equipment, Apparatus and Supplies Used by the Electric Railway Industry
with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Christensen Air Brakes Co.

Anchors, Guy
Elec. Service Supplies Co.
Graybar Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Asphalt Paint
Amer. Asphalt Paint Co.

Automatic Return Switch
Stands
Ramapo Ajax Corp.

Automatic Safety Switch
Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Illinois Steel Co.
Johnson & Co., J. R.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson, J. R.

Axles, Car Wheel
Bethlehem Steel Co.

Axles, Steel
Carnegie Steel Co.
Johnson, J. R.

Babbit Metal
More Jones Brass & Metal Co.

Badges and Buttons
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Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
More Jones Brass & Metal Co.
Westinghouse E. & M. Co.

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Slide
Stueckl Co., A.

Bearings, Roller & Ball
Norma Hoffman Bearing Co.

Bells and Gongs
Brill Co., The J. G.
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Graybar Electric Co.

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Auto Body Co.
Cummings Car & Coach Co.
Graham Bros.

Body Material, Haskellite and Plymrit
Haskellite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Bolts & Nuts
Track
Illinois Steel Co.

Bond Testers
American Steel & Wire Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Graybar Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

Bonds, Rail
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Elec. Service Supplies Co.
General Electric Co.
Graybar Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

Brackets and Cross Arms
(See also Poles, Ties, Posts, Etc.)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Graybar Electric Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Bemis Car Truck Co.
Brill Co., The J. G.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
National Ry. Appliance Co.
Safety Car Devices Co.
Westinghouse Tr. Br. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
La Carbone Co.
Morganite Brush Co.
Westinghouse E. & M. Co.

Brushes, Graphite
Morganite Brush Co.

Bulkheads
Haskellite Mfg. Corp.

Bus Seats
Bender Body Co.
Hale-Kilburn Co.
S. Karpen & Bros.

Buses, Motor
Brill Co., The J. G.
Cummings Car & Coach Co.
Graham Brothers
International Harvester Co.
International Motor Co.
Mack Trucks, Inc.
White Company
Yellow Coach Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.

Cables. (See Wire and Cables)

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Irrington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

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Brill Co., J. G. The
Differential Steel Car Co.

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Elec. Service Supplies Co.

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Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Car Steps, Safety
Irrington Iron Works

Car Wheels, Rolled Steel
Bethlehem Steel Co.

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Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co.

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Brill Co., J. G. The

Cars, Second Hand
Electric Equipment Co.
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Cars, Self-Propelled
Brill Co., J. G. The
General Electric Co.

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More-Jones Brass & Metal Co.

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Ohio Brass Co.
Wood Co., Chas. N.

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Archbold-Brady Co.
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Haskellite Mfg. Corp.
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Track
(See also Snow-Flows, Sweepers and Brooms)

Brill Co., The J. G.

Root Spring Scraper Co.

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Coils, Choke and Kicking
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General Electric Co.
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Cleveland Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

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Elec. Service Supplies Co.
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Westinghouse E. & M. Co.

Commutator Truing Devices
General Electric Co.

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Graybar Electric Co.
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Irrington Iron Works

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International Steel Tie Co.

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Wm. Wharton, Jr. & Co.

Crossing, Manganese
Bethlehem Steel Co.
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Crossings
Ramapo Ajax Corp.
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Crossing, Track (See Track, Special Work)

Crossings, Trolley
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Hyman-Michaels

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Consolidated Car Heat. Co.
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Nat'l Pneumatic Co., Inc.
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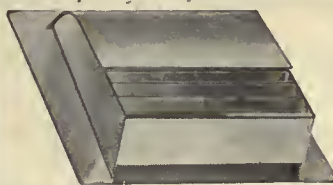
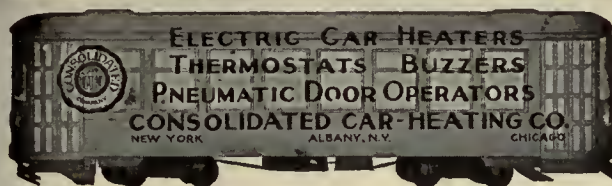
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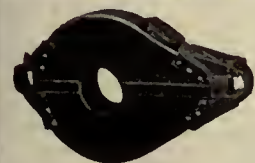
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MODERN CARS “Turn the Tide”

Revitalization of service has again been affected by placing in operation new cars of the modern type, the kind which attract the public and make riders out of walkers.

Prospective passengers on the sidewalks cannot be won to the riding habit with obsolete cars. Make your cars inviting, and watch your revenue passengers increase in number.



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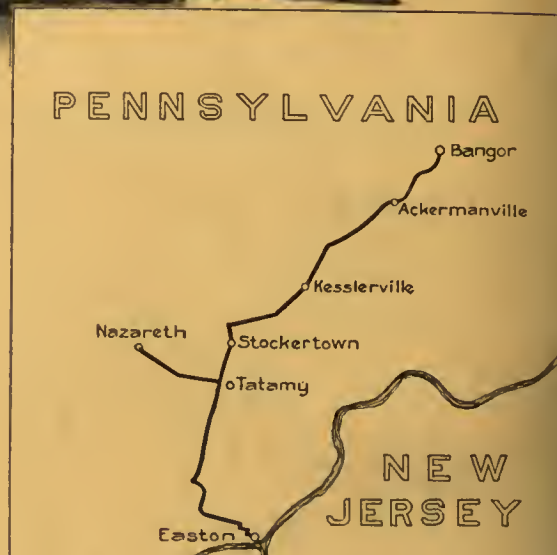
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Increased use of modern, light-weight electric railway passenger cars is necessary if the industry is to attain the high degree of efficiency necessary under present-day conditions. The companies already operating modern cars have pointed the way.



Modern cars have helped the Northampton Transit Company to reduce operating costs



General Electric coordinates in one great undertaking the production of railway electrical equipment and the necessary facilities for its efficient maintenance. By specifying "G-E" you capitalize thorough experience in the problems of electric railway work.

Operating costs per car-mile, 1925:

Maintenance of way and structures	5.8 cts.
Maintenance of equipment	.6 cts.
Power	9.0 cts.
Conducting transportation	8.8 cts.
General and miscellaneous	2.3 cts.
Total	26.5 cts.

Modern equipment used:

Total weight of cars	30,400 lb.
Motors (4-35 h.p.)	GE-265A
Controller (double-end)	G-E type K-35
Air Brakes	G-E with safety car control
Compressors	G-E type CP-27B

11-70

GENERAL ELECTRIC

ELECTRIC RAILWAY JOURNAL

In 1926 Better Paved Track will cost less

IN ONE city Steel Tie Track is being put down for 13% less than wood ties in stone ballast.

If your local conditions correspond to those in this city you can make a similar saving.

An estimate is the way to determine the facts. To estimate you will need delivered prices on Twin Ties and our collection of 1925 construction cost figures.

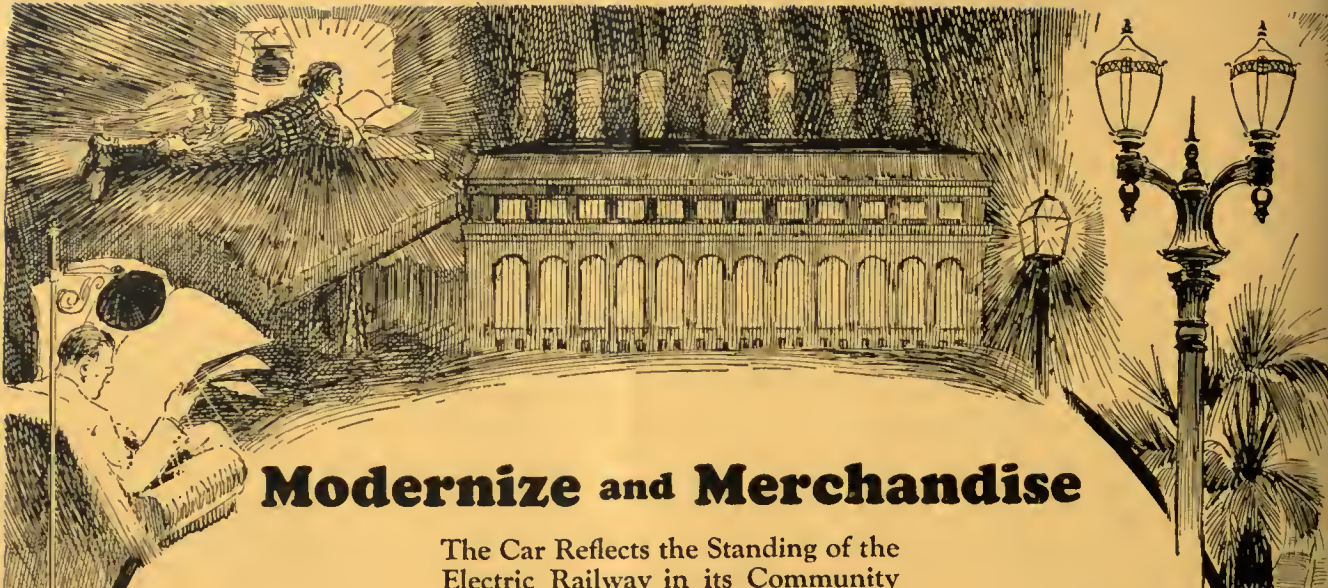
We have forwarded this information to more companies this year than ever before. Why not send for yours?

The International Steel Tie Company
Cleveland, Ohio

This is the work which cost 13% less than their wood tie track in stone ballast. Rail, joints and paving the same in both cases.

Steel Twin Tie Track

Renewable Track . . . Permanent Foundation



Modernize and Merchandise

The Car Reflects the Standing of the
Electric Railway in its Community

The use of electricity for all lighting purposes has steadily and rapidly gained ground since the days of the first practical application of the incandescent principle. The electric light and power industry has never hesitated to scrap obsolete methods and equipment to make way for the more modern.

And, as with the electric light,—
so also in the railway industry must obsolete equipment be replaced. In 1923 BRITTON I. BUDD, then President of the American Electric Railway Association, sounded the

keynote of modern progress for our industry when he said that—

the electric railway industry must modernize and merchandise.

The car is the first place to modernize, as it is with the car that we must merchandise. It has been definitely proven that new, modern, light-weight cars create new traffic—the reason is a superior service to the rider.

There are 28,000 obsolete cars in operation today on electric railways in this country. When these have been replaced by modern cars the railway industry needs to fear no form of competition.

How many of the 28000 obsolete cars have you?

Modern street cars attract patronage



9261

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the United States and Foreign Countries



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Vol. 67
No. 8

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Playing Fair

JUST a short time ago this paper requested a copy of an address to be made by a street railway manager at a coming meeting. This manager seldom prepares advance copies. Nevertheless he sent a copy to ELECTRIC RAILWAY JOURNAL. Accompanying it was a letter from his assistant which said in part:

In compliance with the request contained in your letter of Feb. 3, I am forwarding herewith a copy of the paper which will read at the annual conference.

May I bring to your attention the fact that this material has been prepared at the last moment and would perhaps admit of much criticism from a publication of less generous reputation than the ELECTRIC RAILWAY JOURNAL.

Of course it is because the JOURNAL has earned the reputation of playing fair that it has been able to get advance information like this. It's just another of the many reasons why the JOURNAL occupies the position it does in the electric railway industry.

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This direct circuit can also be used for remote metering.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania

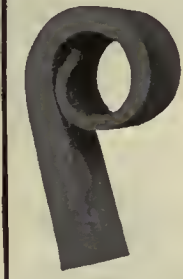
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Ohio Brass Co.

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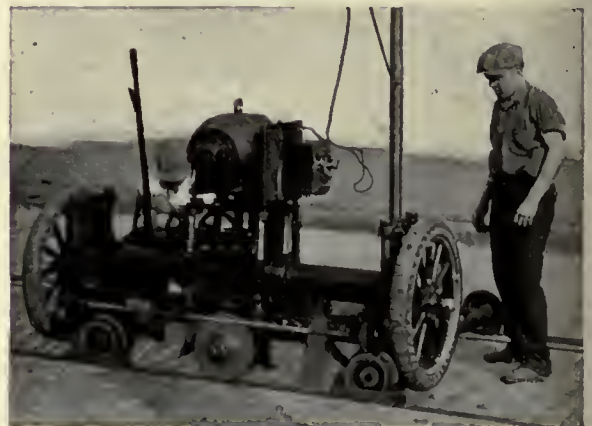
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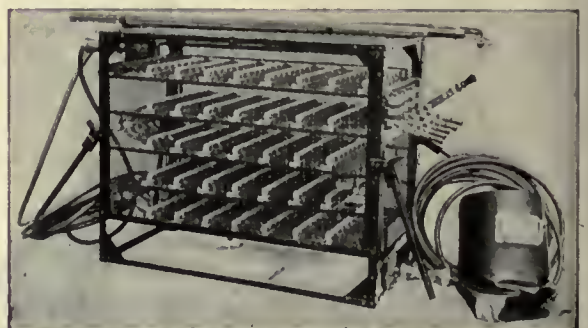
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"Atlas" Rail Grinder

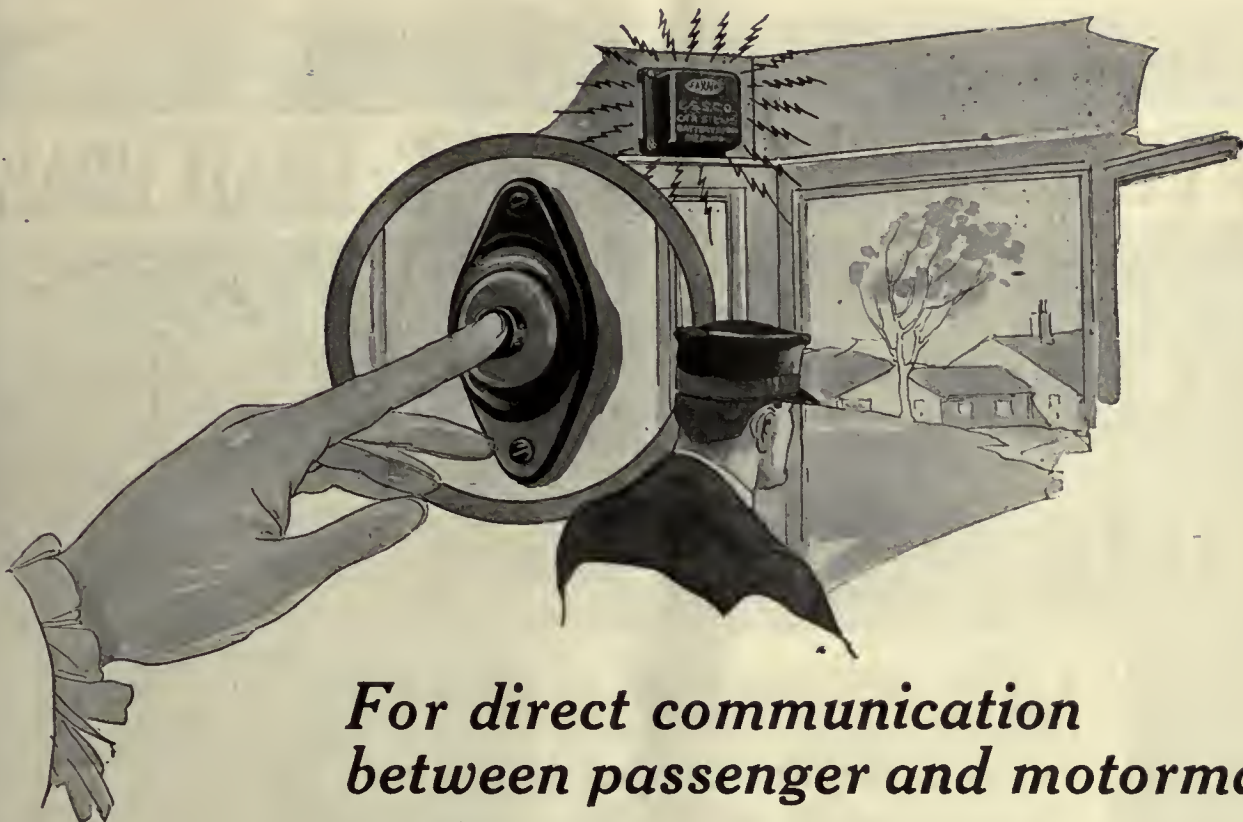


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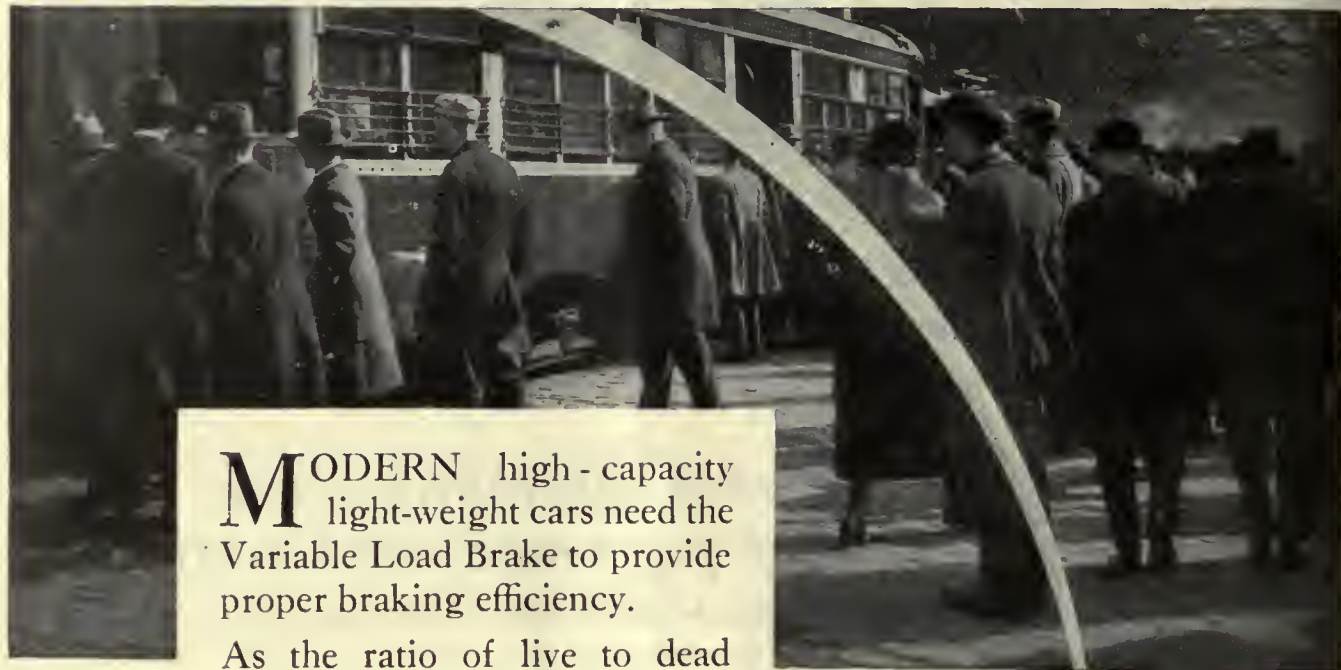
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Push Button



Type B
Push Button

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and

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for de luxe passenger service



Passengers now-a-days are being attracted to cars and buses equipped with the most luxurious and comfortable appointments. Nothing seems to good for the modern rider.

This beautiful chair is a marvel of comfort and occupies minimum floor space. Turns in a circle of— $28\frac{1}{2}$ to $32\frac{1}{2}$ inches diameter. Deep luxurious springs, softly upholstered, and formed to scientific proportions and dimensions give perfect support and rest for the body. An ingenious device in the pedestal prevents chair from swaying, yet permits revolving with only normal effort.

Pattern 15A, illustrated, is especially adapted for the fine Electric Railway Car and Pattern 15, designed on the same lines is for de luxe buses. They may be upholstered in leather, plush or other fabrics.

Hale-Kilburn Seats in various styles for every requirement.

Standard rattan or wood-slat cross seats, inexpensive and durable. Reversible and non-reversible cross seats. Plush or leather covered interurban seats.

Space-saving features included in all Hale-Kilburn Seats. Longitudinal Seats and circular end seating. De Luxe cross seats and double-chair types for cars and motor buses.

HALE-KILBURN COMPANY

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Spinning KW cobwebs

ROLLS that rumble day and night, spinning from red hot copper bars millions of pounds of wires and cables every year. Row after row of wire drawing machines, continuing this reduction process in some cases to a hair-like thread of copper. Stranding, rubber insulating, and braiding machines, building up these copper conductors into finished wires and cables of all sizes and types.

These are some of the processes that take up the twenty acres of manufacturing floor space in the Rome Wire Company's mills.

Because all of these processes are under one centralized control, industry is assured of uniform quality in Rome Wires.

Because of the intimate knowledge of all types of wire which such complete production brings, industry can be, and is, offered the service of an engineering department composed of men who have made a life-time study of the construction and use of all types of wire.

These production facilities and these men are at your disposal in working out knotty wire and cable problems.

ROME WIRE COMPANY, ROME, N.Y.

ROME WIRE

FROM WIRE BAR TO FINISHED COPPER WIRE



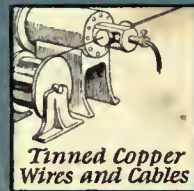
Antenna Wire



*Weatherproof
Wires and Cables*



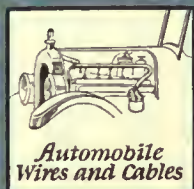
*Trolley Wires
and Cables*



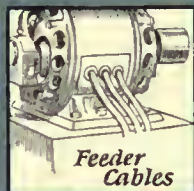
*Tinned Copper
Wires and Cables*



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Wires and Cables*



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Wires and Cables*



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Cables*



*Extra Flexible
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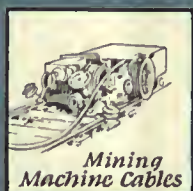
Lamp Cords



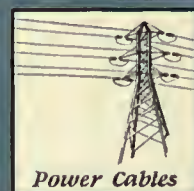
*Lead Sheathed
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Magnet Wire



*Mining
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Power Cables



*Radio Wires
and Cables*

WHETHER you are wiring a building, winding a coil, installing a transmission line, or manufacturing a product that requires the conveyance of electric current, you can find a Rome Wire that will fit your particular needs.

Many of these are indicated in the border of this page, but for complete information you should have the Rome catalog devoted to that particular type of wire.

If you will let us know in what wires and cables you are interested, we will be glad to send you samples, catalogs, and other information that will be of help to you—while an opportunity to quote on any of your wire requirements will always be welcomed.



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Diamond Branch: Buffalo, N.Y.

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Boston — Little Building

Chicago — 14 E. Jackson Blvd.

Detroit — 25 Parsons Street

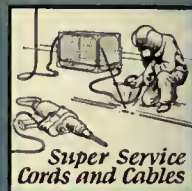
Cleveland — 1200 W. 9th Street

Los Angeles — J. G. Pomeroy, Inc., 336 Azusa Street

San Francisco — J. G. Pomeroy, Inc., 51 Federal Street



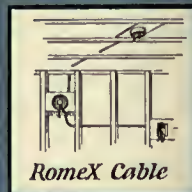
*Slow Burning
Wires*



*Super Service
Cords and Cables*



*Rubber Covered
Wires - Code 30%
Intermediate*



RomeX Cable



*Copper Rod and
Bare Copper Wire*



Newest of the new—in Coral Gables

This sample Coral Gables Car (shown at Atlantic City) was designed to fit the setting of an idealist's Spanish development and was built primarily for passenger comfort and convenience.

Such a stipulation presupposes the installation of complete National Pneumatic Door Control Equipment—not only in the sample, but in the nine duplicate cars which have been subsequently ordered.

Details on request

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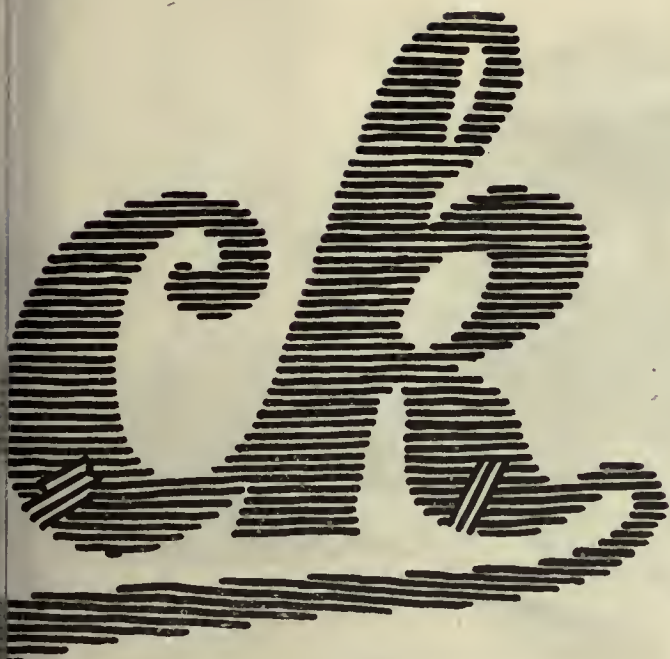
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Railway & Power Engineering Corp. Limited





*The Bus
as you buy it—*

Mack roofs built as carefully as a bridge!

Bridges and bus roofs are both subject to strain. Both must be designed along engineering lines. Only the best materials must be used. Both must be reinforced. Both must have a factor of safety.

Mack builds its roofs like bridges, to stand the gaff of service over a long term of years.

Nothing but solid ply-wood roofing, to give added strength for the amount of weight, is good enough for the Mack.

To make construction rugged, Mack uses ash ribs strongly reinforced with steel plates and stamped steel gussets.

Wiring should be accessible—so Mack lays it that way.

Ventilators should be more than holes, so Mack uses special ventilators of improved type, three in number and figures them carefully as to position.

Throughout the rack and tear of constant service, Mack roofs stand up. In ice and snow, sun and rain, the sturdy construction underneath assures the resistance that means long life.

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York City

One hundred direct MACK factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY," "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," and "MACK TRUCKS OF CANADA, LTD."



The
Mack
Bus



Points of *Refinement* about Lang Bodies

Craftsmanship expressed in the inviting entrance ~

LANG BODIES feature many points of refinement that show the highest degree of craftsmanship in body building.

For example, consider the inviting entrance. The door is always under the complete control of the driver and covers the step well when closed. A step light automatically guides the passenger—and even such a detail as the grab rail is placed in the exact position to assure the easiest reach.

It's the little things that count—in body building; points of refinement that although small in themselves contribute greatly to passenger comfort and the operation of the bus.

Experienced in designing and building highest quality bodies, Lang body engineers express their craftsmanship in every detail.



The Potter

A Mark of Craftsmanship

The potter in moulding a lump of clay into a thing of beauty, employs a craftsmanship that results from years of experience. He is an artisan.

Lang body engineers, by their command of raw materials, employ a craftsmanship which is expressed in the finished job. They, also, are artisans.

LANG
BODIES
Miles & Smiles
for Rider for Driver for Owner

DESIGNERS AND BUILDERS OF INDIVIDUALIZED BODIES
FOR THE BUS MANUFACTURING INDUSTRY

THE LANG BODY COMPANY • CLEVELAND • OH

The Phono Record

1865 A bulletin of Phono-Electric Achievement 1926

Memphis St. Railway Standardization On Phono-Electric

*Installations Already in Service
Prove Eminently Satisfactory*

Conditions of trolley wire service in Memphis, Tennessee, are anything but easy. This busy and progressive distributing center of the Southern cotton and lumber region, uses its urban transportation freely.

Memphis made its first installation of Phono-Electric Trolley Wire in 1919. Five years later this wire was still in service at some of the heaviest traffic points in the city. Probably it is still on the job, for the proven record of Phono-Electric in this and other cities has shown such exceptional service to be the rule rather than the exception.

Naturally the Memphis Street Railway Company proposes to standardize on Phono, as soon as this can be done in conformation with operating programs.

Bulletin on Phono Facts

What Phono-Electric will stand in a fire, what it will stand under heavy fatigue strains, how its remaining life may be determined at any time during service and many other useful facts are illustrated and tabulated in a recently issued bulletin published by Bridgeport Brass Company.



*Phono-Electric Trolley Wire at Union Avenue and 3rd Street,
Memphis*

**Original Wire
Lasts 2,000,000
Car Passes**

Still in Service

Time and again we find and record instances of truly exceptional wear from Phono-Electric installations. Were it a new product these might well be accepted merely as exceptions and not as a safe basis for figuring trolley maintenance.

But where, as is the case with Phono, they are constantly repeated under every operating condition, over a period of 30 years and more, they must be a true indication of average results.

On a conservative estimate Phono-Electric outwears hard drawn copper trolley wire two or three times.

“Bridgeport”
TRADE CO. MARK
Phono-Electric



Bridgeport
Brass Company
BRIDGEPORT - CONNECTICUT



Goodyear Balloon Tire Equipped Coach No. 214
of the Colonial Coach Lines, Watertown, N. Y.

GOODYEAR

Copyright 1926, by The Goodyear Tire & Rubber Co., Inc.

"They have given us Double the Mileage"

Mr. H. B. Weaver, Chairman of the Colonial Coach Lines Company, Watertown, N. Y., writes us, describing the ideals of his Lines' service and the experience they are having with Goodyear Pneumatic Bus Tires:

"We are trying to give our patrons not only a very convenient and very economical service, over our 900 miles of road between the Pennsylvania border and the Canadian line, but also a very comfortable and dependable one.

"Ours is by no means a difficult route. Practically every mile of it is improved. Yet it has its rough spots, and in season we have ice, snow and mud to battle.

"In this duty the performance of the Goodyear Tires with which

several of our buses are equipped has been most satisfactory.

"We have Goodyear Cord Bus Tires in service today that have given us *double* the mileage we have received from other pneumatic bus tires.

"They also double their advantage by giving us *trouble-free* mileage. They fit in exactly with our Lines' policy of providing the public with every essential and luxury of motorized highway transportation."

* * *

Goodyear Bus Tires make records for long, economical, trouble-free mileage wherever they are used. The Goodyear Bus Tire line offers you the particular tire that is suited to your operating conditions.

For every Goodyear Cord Bus Tire there is an equally fine Goodyear Tube, built especially to the needs of bus service

BUS TIRES

Made with SUPERTWIST



A good Rewind —as good as the original job

Ready-cut insulations and properly fitting armature coils are essential if you wish to make rewind armatures as good as new.

These insulations are supplied in convenient packages, one set to a package. Each set contains not only just enough material, but all cut for your winder so he need waste no material —nor spend time in cutting and fitting.

Most important of all is the *original equipment quality* of standard packaged insulations, ready-cut for G-E Motors. These can be supplied only by General Electric.



Nothing has added so much to the quality, and to the economy, of armature rewinding in recent years as G-E Ready-cut Insulations. It will pay you to standardize on their use and stock them as you do armature coils.



For
Original Equipment Quality

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

MORRIS BUCK, *Managing Editor*

Volume 67

New York, Saturday, February 20, 1926

Number 8

Car Floors Can Be Given Increased Attention

FLOOR coverings of some rubber material or linoleum are being tried by many railways to replace the ordinary wooden floor with raised slats. This improves the appearance considerably and has an added advantage in reducing noise. Some difficulties have been experienced from uneven wear and a tendency to warp and buckle. Costs of keeping such floors in good repair are not available, but definite figures as to the cost of maintaining them are looked forward to with interest.

Trapdoors are considered an eyesore by most transportation departments but a necessity by the mechanical departments. Since they are required for proper inspection of motors they should be given particular attention so as to harmonize with the remaining floor area and not create the impression on passengers that they are something to be avoided.

Whatever type of floor is used it requires careful design to prevent the openings for trapdoors from gradually showing worn and soiled edges. Of course the openings are included for a specific purpose, and if they are not used they are of no value. But care in the selection of the floor covering and care in maintaining it will do much to prevent unsightliness.

Removal of Obstructions from Car Interior Should Give More Pleasing Impression

VARIOUS arrangements of stanchions and barriers have been used on car platforms for directing passenger movement. By separating incoming and outgoing passengers less confusion and more satisfactory operation usually result. In general, however, such barriers are looked upon with disfavor by passengers. People resent the impression of being penned up or herded. Several railways have improved conditions by a removal of some of the barriers and a rearrangement of the remaining ones. The change can be made in a manner that will remove the source of annoyance and still retain most of the good features of the plan.

The problem of keeping stanchions and barriers in good condition is a difficult one, but nevertheless it should receive more attention. Porcelain enameling appears to be satisfactory only for straight lengths of pipe. It also is likely to chip, and when it does so the exposed iron is unsightly. Aluminum and brass oxidize and become unsightly, galvanizing is unsatisfactory and iron pipes with enamel paint leave much to be desired. Light colors, while they have a most pleasing appearance when kept fresh, require constant cleaning. Dark colors are easier to maintain but do not create the

pleasing impression that is so desirable when a passenger boards the car. Altogether designs of stanchions and barriers leave much room for improvement.

The arrangement of railings and hand straps inside the car is another thing that may create an unfavorable impression on the passengers and give a ragged, unfinished appearance to the car that is entirely out of harmony with the modern trend toward light weight and pleasing design. A judicious arrangement of such equipment will increase the range of vision and give a more satisfactory appearance.

High-Pressure Salesmanship Needed in the Electric Railway Field

ONLY a few years ago efforts on the part of electric railway executives toward the merchandising of transportation were practically nil. The street car afforded the only convenient means of transportation for the majority of urban and interurban passengers. The electric car had no important competitor and the passenger no choice in his method of travel, as it was necessary for him to utilize such facilities as existed. Knowledge that the public was compelled to use electric cars became so firmly imbedded in the rank and file of street railway employees that it has been most difficult to change this attitude. Advent of the private automobile and later the luxurious bus created an entirely new situation. The riding public has in many cases been in a position to choose its transportation medium, and naturally its choice has been with the more attractive and pleasing vehicle. Passengers are no longer satisfied with any antiquated, noisy, hard-riding vehicle on wheels, but demand speed, comfort and cleanliness. It is only natural that the private automobile should be used extensively under unfavorable conditions.

Recognition of the existence of serious competition has served to awaken the industry from the self-satisfied attitude which has been quite prevalent. It has been said that next in importance to doing the right thing is advertising that you have done the right thing. Earnest effort to improve railway service, it is believed, exists in every street railway organization, but this effort will not produce the desired results if achievements are not effectively placed before our customers. Railways have an article to sell; the sales organization exists. It must, however, be organized and it must be made to function.

High-powered salesmanship under able leadership is required in the transportation field to the same degree that it is required in any manufacturing field. No manufacturing company, no matter how efficient the

productive organization might be, would expand and grow without a highly-trained sales department. The railways have a product to sell which is in natural demand, and this demand can be capitalized only through effective salesmanship. Every employee who comes in contact with the public should be an enthusiastic member of this organized sales force. When this has been accomplished, the private automobile will be used to a lesser extent, particularly in crowded cities, street car riding will increase and net revenues will show decided improvement.

Substitution of Car Names for Numbers Presents a Problem for Master Mechanics

SEVERAL electric railways have recently adopted the practice of bestowing names on their passenger cars in place of the old-fashioned numerical designations. This change deserves careful consideration from two angles. Will it have a beneficial effect in popularizing the transportation service? Will it add to the problems of the master mechanic by complicating the classification of rolling stock?

From the transportation standpoint results have shown that there is a real advantage in using names on cars rather than numbers, according to several railway managers who have adopted the practice. Perhaps it has a tendency to personalize the service by giving each vehicle a definite individuality. Use of local names appeals to local pride. The mere novelty of the scheme has a certain appeal. In any event the public seems to take kindly to the use of car names.

From the standpoint of the master mechanic the change undoubtedly involves some difficulties. In this connection it is interesting to consider the practices of the Erie Railroad and the Pullman Company. For a number of years past it has been the custom of the Erie to place the name of the engineer on the cab of one locomotive of each division instead of the number. This special recognition is believed to improve the morale of the engine man. The locomotive, however, retains its original number and is known by this number in all the records of the mechanical department.

Identification of the rolling stock of the Pullman Company, which is known only by name, is a more difficult problem. Every car has a plan number in addition to the name. For example, the latest twelve-section drawing room sleeping cars are known as plan 3410. A descriptive list is printed periodically and distributed to the mechanical department, showing the names, plan numbers and types of brakes, couplers, trucks, electric fixtures, water and heating systems with which the cars are equipped. Information is also given as to the exterior design of the cars. In addition, all of the different terminals are furnished with very complete catalogs of parts, illustrated with photographs of each part. This facilitates the identification of the part and reduces the liability of wrong replacement parts being furnished.

Since the number of electric railway cars identified by names is likely to be comparatively small on any one property, the method used by the Erie seems to be the easier solution of the master mechanic's problem. It will be well worth while, however, to give due consideration to this question at the very beginning, because the difficulty of keeping track of the kind of parts required will increase rapidly as the number of names increases.

The Manufacture of Parts by Railways Is Often Poor Economy

HOW often the question has been asked as to whether or not operating companies have exceeded their proper field of effort in undertaking a large-scale manufacture of parts! Walking into the erstwhile maintenance shops of some railways one is struck with the feeling that he has by accident happened upon the plant of an equipment manufacturer. Shiny new parts are to be seen in every direction.

But—and of course there must be a but—it is well to consider just where this situation is leading. To say that circumstances never justify the manufacture of parts by operating companies would be absurd. But it would be equally foolish to cast discretion to the four winds and to enter upon a period of stubborn competition with the established manufacturers. Competition in itself, if limited to proper bounds, stimulates a healthy condition in any industry. However, care must be observed in steering clear of what may at first glance appear to be a means of effecting real savings in manufacturing costs, but which may later manifest itself in its true colors as a costly anomaly.

Were it possible for individual companies to take upon themselves the task of manufacturing all of the widely diversified products needed in their operations and to carry out this task quite as cheaply and as effectively as the regular manufacturers are able to do, then would the latter firms be hard put to it to defend their economic prerogatives. But under the existing order of things this is manifestly impossible. Each year the manufacturers spend vast sums of money in research and development programs. Since the cost of such work would be far beyond the reach of individual companies, the immense value of all this engineering endeavor would be lost to the industry.

Shop superintendents and purchasing agents of the various companies are frequently deluding themselves concerning the true economies to be effected by undertaking the production of new equipment and replacement parts. It is simply a matter of accurate book-keeping. Instead of fairly apportioning the item of shop overhead between maintenance and new parts manufacture, they have placed the entire burden upon the former. This has resulted in an absurdly small apparent cost for manufactured parts, as shown on the books.

Right Materials Essential for Armature Repairs

SO MUCH depends on the perfect functioning of a railway motor armature that it is essential to keep it in as good operating condition as possible. The modern armature is a rugged piece of apparatus, even though the wires, commutator bars and insulation are relatively delicate. Motor manufacturers go to great pains to build armatures correctly. They have done a great deal of development work covering a long period of years, and have profited greatly by study of the service records of many armatures.

Since even the best of armatures will fail in time, it is necessary to repair them so that they will once more do their work as at first. In practice, however, many railways do not put them back into their original condition. Frequently other materials are employed and

other methods of winding are resorted to than those developed by the manufacturer. While some of these substitute practices are excellent, in general it may be stated that they cannot produce results better than the original.

An article by Jesse M. Zimmerman in this issue, which gives in detail the practice of one manufacturer, is well worth the attention of the master mechanic and armature foreman. While the practice of other manufacturers may differ somewhat in detail the general principles are the same. Close adherence to such methods should result in far less failures than are common on some roads.

Hope Springs Eternal in New York City

MAYOR WALKER of New York hopes to negotiate a city-wide bus franchise with a 5-cent fare clause, it is said. Such optimism is truly remarkable. Few of the forty-odd applicants for franchises have offered to carry passengers for 5 cents, and it may be doubted if those who have offered could actually carry out any such plan. Only a short time has elapsed since the Tompkins Bus Corporation on Staten Island found that it could not operate profitably on a 5-cent fare and increased its rate to 10 cents. Operating conditions on Manhattan Island are more difficult than on Staten Island. Due to the prevailing traffic congestion the speed would necessarily be slow and the cost of operation correspondingly high. In recent years many trucking concerns in New York have substituted horse-drawn vehicles for motor trucks to cut down the expense of time wasted in traffic jams.

It is said that one of the chief advantages of a city-wide franchise would be that the operator would take the lean lines along with the fat ones. At a 5-cent fare, however, it's a safe guess that most of the lines would be lean.

A Good Name Cannot Be Measured in Dollars

PUBLIC relations men have for years been preaching the value of square dealing with the officials and residents in a community served. They point out that consistent adoption of this policy has a lasting value. But it is not so often that they have the opportunity to point to tangible results that show just how much influence such a policy has on a utility.

Seldom has there been an expression of opinion so favorable to a utility and its management as that given J. N. Shannahan and his associates on the occasion of their sale of the Newport News & Hampton Railway, Gas & Electric Company. The local newspapers have gone to great length to express editorially the sentiment of the people in the community. "The company has never attempted to dicker with the municipal bodies of this section," says the Newport News *Times-Herald*. "To the contrary, it has treated those bodies with consideration, has kept no secrets from them, has laid its case in frankness and confidence before them whenever any emergency in its affairs has arisen. . . . In short, the company has made itself part and parcel of the community and has heartily co-operated with the people in all movements and enterprises for the common good. It has been a good and helpful partner and has

rendered service in many directions outside of its immediate sphere of activities."

While praising the work of the company, the same newspaper points out particularly Mr. Shannahan's leading part in it. The Newport News *Press* goes even farther, saying, "It is not in disparagement of the other officers to say that this is due primarily to the integrity and the fidelity of President Shannahan. He is an upright man and a loyal citizen. He has dealt with the community not in selfishness but in the spirit of fairness and generosity."

Such praise is praise indeed. But the value of this mode of conduct is not overlooked by the *Press*. "His indorsement of any enterprise is sufficient to inspire the confidence of investors." That is the acid test. The results that have been obtained by Mr. Shannahan show that his methods should be studied by other operators.

Maintaining Axle Bearings of Paramount Importance

HEAT generators is the name given to bearings by one workman. This is true. The object of the manufacturer is to design the bearing to generate as little heat as possible, and that of the maintenance man to keep it running on a low production basis—as to its byproduct, heat.

Attention is again called to the information on bearing practice developed at the January meeting of the Metropolitan Section of the American Electric Railway Association. The papers, which were abstracted in this paper, issue of Jan. 16, showed that more attention should be given to the subject of bearing wear and replacement. The range in wear over a given period by different roads under quite similar conditions shows that much can be done by the average road to get less wear.

Oiling is also important. A sufficient flow to keep the bearings lubricated is an essential that never should be overlooked. Too many operators save oil at the expense of bearing metal, with the result of poor performance. The work of packing bearings is so important that good men should always be assigned to it and they should be given the best of instruction.

Perhaps the bearings most difficult to maintain are those supporting the driving motors on the car axles. Necessarily these must be split to allow easy removal of the motors. They receive a maximum of thrust from side to side as the axles are moved, due to track imperfections or curves and special work, as well as due to the shifting of the motor itself from side to side. The weight is also unsprung.

An article published in this issue shows the bad effects of excess bearing clearance on the meshing of gears. Even a slight increase in the distance between centers throws the gears out of alignment and causes excessive wear. When the bearings are worn so that the centers are $\frac{1}{4}$ in. too great, as happens frequently, conditions are far more serious.

Despite all these difficulties and opportunities for undue wear it is these bearings that determine the life of gears and pinions and the incumbent noise arising from their operation if gear centers become spread due to wear in the bearings. Care should be taken of all bearings, their lubrication and maintenance as well, but particular care should be given to the axle bearings if low gear and pinion cost is desired.

Rail Bond Maintenance

Several Types of Bonds Have Been Tried in the Electrified Sections of the Chicago, Milwaukee & St. Paul Railway—The Maintenance Methods and Organization Used Are Described

By Charles G. Lotell

Assistant Engineer, Electrification Department,
Chicago, Milwaukee & St. Paul Railway, Seattle, Wash.

WHEN plans for the electrification of the mountain divisions of the Chicago, Milwaukee & St. Paul Railway were prepared, it was decided to use a bond with an expanded terminal, expansion being secured by means of a tapered pin driven through the hollow terminal of the bond. This type of bond had been in use on a number of important roads and at that time was probably the preferred form of rail bond for steam railroad electrification. The consideration which was felt particularly important in selecting this type of bond was that it provided a bond which the section crews could install readily, as most of the tools required would already be normally in their possession.

All bonds were single conductor, 250,000 circ.mil capacity, made up of 61 wires. The terminals were $\frac{7}{8}$ in. in diameter and $1\frac{1}{2}$ in. long under the head. The hole through the terminal was 0.406 in. and was expanded with a $\frac{1}{2}$ -in. diameter steel pin. The bonds were installed in rails of 85 and 90 lb. standard sections on the main line, and on miscellaneous rails from 56 lb. to 85 lb. on the side tracks. In general, 100 per cent, Bonzano, angle and Weber joints are found on the 90-lb. rail; continuous and angle joints on the 85-lb. rail; and angle joints on the smaller rails.

Three forms of bonds were used, depending on the nature of the rail and joints. Where space under the splice bar was sufficient, and conditions permitted the removal of the bar, a concealed bond was used. This bond was provided with a crimp between the middle bolts to provide for expansion and flexibility. Where there was sufficient space under the splice bar, but it was undesirable to remove the bar, a bond with one welded and one detached terminal was used. One joint bolt was removed to allow the passage of the crimp, and the bond was pushed into place under the bar. The loose terminal was then soldered on and applied to the rail in the usual manner. On the remaining rails exposed bonds were used enough longer than the splice bars to provide the necessary clearance and to permit stapling the bonds to the ties.

DOUBLE BONDING USED FOR LARGE CURRENTS

Exposed bonds were installed on the inside face of the rail, as this position appeared to result in less damage to bonds in cases of derailment. Where the contemplated current per rail was more than the carrying capacity of one bond of the standard size, double bonding (i.e., two bonds per joint) was used. In exposed bonding, one bond was identical with those used in single bonding and the second was enough longer to extend beyond the terminals of the first. When concealed and semi-concealed bonds were used, the two bonds were identical but on opposite sides of the rail. Both rails of the main line were bonded. On side tracks one rail only was bonded, but provision was always

made for two connections of such tracks to the return circuit.

The concealed and semi-concealed bonds had extended lengths of approximately 20 in. and 38 in., respectively. The single exposed bond was, in general, 37 in. in length, and the second bond in double bonding was 42 in. On account of some of the angle bars on the lighter rails being six-bolt bars, special bonds of longer lengths were occasionally required.

Since the contact resistance of this type of bond depends on the conditions of the contact surfaces and on the pressure obtained between surfaces, the care with which the bonds were applied was very important. Carefully prepared instructions were furnished to both the installation forces and to the operating forces that were required to take care of bond replacements. It was required that the terminals be cleaned with fine emery cloth and the hole in the rail wiped out with a piece of clean, dry cheesecloth immediately before the bond was applied. No lubricant was allowed on the drill bits. To make certain that a good fit was obtained, a plug gage was provided and all holes gaged. If holes were accidentally drilled oversize, the bonds were installed with an oversize pin. However, great care was used in regrinding the bits so as to guarantee holes of proper diameter. Careful supervision of all parts of the installation work was found very desirable.

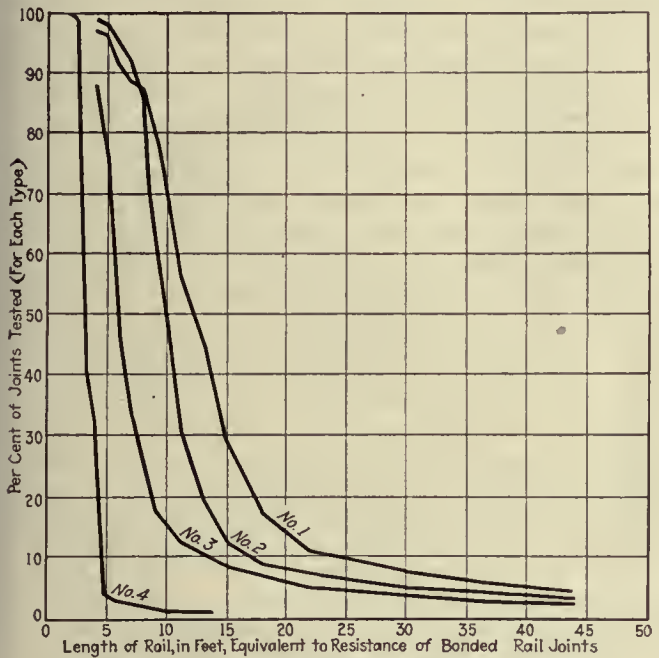
SOME SPECIAL EQUIPMENT USED FOR DRILLING

For drilling the holes for the application of the bonds, hand-operated drills were used throughout on the first two divisions electrified. On the Coast division, however, a very large proportion of the work was drilled by air-driven drills, the power being supplied from an Ingersoll-Rand air compressor. A special drill carriage was made up to hold, guide, and feed an air drill. The use of this equipment accomplished a very decided saving in the cost of application of the bonds and was used with good success. It was only when the necessity for rushing the work required establishing additional bonding crews and compressors were not available that hand drills were used on this division. The saving secured by the use of the compressor is reflected in the cost of applying bonds by the two methods, the cost per bond, using hand drills, being about 49 cents as compared with a cost of about 31 cents for bonds applied where the holes were drilled with air. These are direct labor costs only (including foreman and all men in crew) with a laborer's rate of 53 cents. Adding other labor charges such as repairing equipment, moving, etc., the above figures should be increased by 13 cents, and to this must be added tools, equipment, camps, transportation, etc.

When one compressor was being used the crew usually consisted of one foreman, two drillers, two gas-

engine men, eleven helpers, and one camp helper. The cost when applying concealed bonds was about double the above.

After the initial installation was completed by the electrification department, the roadway forces and the signal department were made jointly responsible for the maintenance of the bonds. Section crews were to replace bonds where rails were renewed, but the signal maintainer was to be notified in each case so that he could inspect the work. Full instructions in regard to installing the bonds were incorporated in the special instructions which were issued covering the electrical operation. These instructions were placed in the hands of all section foremen, as well as all other employees having to do with electrical operation. The instructions covering the installation of bonds were substantially full specifications for maintenance and renewals.



Resistance of Bonded Rail Joints—Missoula Division
Special tests were made to determine electrical resistance on 2,725 rail joints, as follows:
Curve No. Type of Bonds No. Joints Bonds per Joint Weight of Rail
1 Pin type 1,143 1 85 lb.
2 Pin type 515 1 90 lb.
3 Pin type 809 2 90 lb.
4 Welded 258 1 85 and 90 lb.
All measurements made between points 30 in. apart.
Curves show for various rail lengths, percentage of rail joints with resistance equal to, or greater than, such lengths.

Where new rail was laid or other causes required the bonds being replaced, new bonds, drawn from the storeroom, were used in every case, the bonds removed being sent to the state department for re-forming. At first these used bonds were merely inspected and strands straightened, and when again replaced in rails, special oversize pins were used. The amount of oversize of these pins was considerably more than that of the pins classed as oversize and used, where necessary, in the application of the new bonds. A method was later developed whereby the terminals of the second-hand bonds were reshaped so as to bring the tubular portion of the bond back to its original length, and inside and outside diameters. These bonds were then handled in the same manner as new bonds. A very appreciable saving in the cost of replacing bonds was secured by this practice of recovering used bonds.

This method of repairing the bonds overcame several

serious objections to the use of second-hand bonds. Previously, considerable confusion had arisen through the necessity of using various sizes of pins, extra oversized pins being used in new bonds or the small oversized pins in used bonds. Even after being applied with the proper oversize pins, poor contact was secured in many cases, as the original shape of the terminal had been changed by the process of application and removal, although a tool had been especially designed for removing the terminals. It is, of course, very costly to scrap the bond when replacement is necessary. To scrap a 37-in. bond and apply a new one involved a net expenditure for material of about \$1.15, whereas the cost of repairing was only 70 cents.

In addition to the inspection which was expected from track forces and signal maintainers, a bond repair crew goes over all the trackage, inspects the bonds and replaces those found defective. The latter are usually bonds which had been installed by the section crews in connection with rail replacements. The personnel of these crews is subject to rather frequent replacement and it is difficult to make even the older men appreciate that more than a mere tight connection between rail and bond is necessary. Our experience with the installation of bonds by section crews is, therefore, rather unsatisfactory.

Meanwhile, the gas weld bond had been developed to such an extent in interurban and similar service that we decided to determine its suitability for our own trunk-line conditions. Its attractive features were its relative cheapness, more reliable and permanent bond and rail contact, assuming proper installation, and greater ease of inspection.

CONDITIONS MET BY GAS-WELD BOND

Our problem was, mainly, to determine: First, whether the welding would have any deleterious effect on the steel of the rail; second, whether bond maintenance and replacements could be handled without ultimate uneconomical increase in existing maintenance forces, and third, whether the bond itself would stand up under the actual service conditions.

In order to determine the effect on the steel of welding the bond to the rail, the railway company had microscopical and chemical examinations of the steel made by a competent testing laboratory after a bond had been applied. The observations indicated that no serious injury was done to the rail as a whole. The experience of other companies was also studied, and the conclusion reached was that the welded bond could be tried safely.

In changing to this type of bond it was not possible to have the application made by the section forces and, therefore, it was arranged that the signal maintainers should be supplied with welding equipment and do the welding work. This arrangement has worked out very satisfactorily. The men have learned the operation of welding quickly and they are supplied with small tanks of welding gas, which may be carried easily on the gas cars commonly used by signal maintainers. The signal department is thus placed in charge of all bonding and bond maintenance, whether or not the bonds are on rails involving signal circuits. This removes an undesirable condition previously existing wherein the signal maintenance forces were responsible for the condition of the bonds without having direct supervision over the forces which applied the bonds. In addition to the bond maintenance work done by the signal maintainers who have

fixed headquarters, there are the bond testing crews previously mentioned that move from place to place and whose duty it is to make a routine test of all bonded joints and replace defective bonds. These crews are used also wherever there is extensive rail relaying work and the application of a number of bonds is required.

SAVING RESULTS FROM USE OF GAS-WELD BONDS

The cost of applying the bonds varies, of course, with the conditions under which they are applied. Taking, however, for the sake of comparison, a condition where a number of bonds are to be applied in rail re-laying work it is found that the cost of the gas-weld bond is for the bond, gas, etc., about 70 cents, and for labor 38 cents, or \$1.08 per bond. The cost of the 37-in. pin-type bond would be for materials \$1.50 and for labor \$0.45, or a total of \$1.95. Thus a saving of about 87 cents per bond is realized. This saving is increased in territories where double bonding is used with the long bond, since a single bond only is required when the shorter bonds are used. This fact was determined by calculations of the relative heat conducting capacity of two types of installations, the favorable results of which were afterward confirmed by actual trial.

The welded bond, when properly applied, has a low contact resistance and this resistance does not increase with age. A defective application is usually more readily detected than with a pin-type bond, although we have had some cases where the steel sleeve of the bond was welded to the rail, but the strand was not, so that, although the bond appeared all right, the resistance was high, since the sleeve is not, in manufacture, welded to the strands. Such cases of defective welding appear to be very few and will decrease in number as the welders become more proficient.

Application of gas-weld bonds was started in 1921, since which year practically all new rail laid has been gas-weld bonded and a large part of the maintenance work, particularly in the past two years, has been done with this bond. A No. 0000 bond, 7 in. long, with pressed steel terminals is used, formed U-shape and welded to the ball of the rail.

TESTS SHOW RESULTS ACCOMPLISHED

The experience to date with it has been very favorable, and unless there are objections not yet apparent the use of this bond will be continued. It has not been in use long enough yet to determine fully to what extent breakage of strands will be experienced or to be sure what the ultimate effect of welding will be on the rails, but these points were taken into consideration before the use of the welding process was begun, and it is not expected that sufficient trouble will be experienced from these causes to overcome the advantages of this type of bond.

In conclusion, it may be interesting to give the results of a special investigation which was made in 1924 of the bonding conditions on a considerable portion of our older electrified line. Over 3,000 bonds were tested at points so selected as to indicate the average condition of the bonds. Measurements were made by using two voltmeters, one indicating the drop in the bond and the other the drop in a fixed length of rail. The result of this study is shown on the accompanying curve, which shows the percentage of bonds with conductance less

than the conductance of the stated rail lengths. The original pin bond installation, much of which still exists, was made in 1914 and 1915. The gas-weld bonds have, as already stated, all been installed within recent years.

Hot Brine Clears Car Tracks Quickly

Motorists Unconsciously Aid Snow Removal Along Lines of the Cumberland Traction Company—Tracks Cleared in One-Third Time Otherwise Needed

COLD dry snow to a depth of 14 in. covered the tracks of the Cumberland Traction Company, Bridgeton, N. J., when the blizzard of Feb. 11 ended. One plow and one sweeper, the snow-fighting equipment of this railway, had been put in service soon after the storm began and they experienced no difficulty in getting through on the 10-mile interurban line to Millville. After returning to Bridgeton the local lines were cleared. The high wind, however, drifted the dry snow badly and the rails were soon covered again to a considerable depth. The path cleared by the sweeper was immediately chosen by the local motorists when they began to operate the following morning. A slight rise in temperature softened the snow and it was soon packed down hard on the tracks to a depth of about 4 in. The railway equipment proved powerless to remove this coating from the rails.

Under similar circumstances the attitude of the former management of this company had been "the Lord put it there, let the Lord take it away." The present manager of the road, Clayton W. McPherson, remarked, however, that while he had a great deal of faith in the Lord, he was not sure just when the ice would be taken away, so the company hired laborers with scrapers to try to remove it. One gang of twelve men took six hours to clear 3,900 ft. of track. Another gang of fifteen men at the Millville end of the line took nine hours to clear 4,800 ft. Salt was sprinkled both before and after cleaning.

Progress by this means was so slow that the manager decided that some more effective means must be employed. Motor trucks were borrowed from a local ice cream plant and filled with a boiling hot mixture of salt and water. This escaped onto the tracks through the vents provided to allow melted ice to run away. The first tank wagon was started late in the afternoon in the worst downtown section. Automobile traffic continued to follow the car tracks and churn up the salty mixture. In 30 minutes the steel rails were again visible. Soon the 14 miles of the company's route was open and the cars were running. It is believed by the management that at least another 24 hours would have been required to open the lines without the use of hot brine.

Previous to the application of the brine the men cleaning the track averaged about 31 ft. per man per hour. After this treatment had been applied it is conservatively estimated that progress was three times as fast. Altogether 23 loads of brine were used by three trucks. Each load consisted of approximately 400 gal. of water and 460 lb. of salt. The total cost of ice removal by this method was approximately \$1,000.

Rewinding Railway Armatures

Descriptions, Functions and Location of Armature Rewinding Insulation,
Core Insulation and Banding Material Will Help
Repairman to Do a Better Job

By Jesse M. Zimmerman

Engineering Department, Westinghouse Electric & Manufacturing Company,
East Pittsburgh, Pa.

EACH piece of insulation used in rewinding armatures for railway motors has a definite function to perform and accurate location is important. Insufficient insulation at some points may result in short circuits or grounds, while too much may cause the coils to build high and make winding difficult. Information regarding the material used in winding the Westinghouse type 306 railway armature has been gathered and is given to help the repairman who rewinds this and similar type armatures.

Material used for rewinding is divided into three groups, (1) core insulation, (2) winding insulation and (3) banding material. When making minor repairs on an armature, it may be necessary to use only the banding material. In rewinding an armature sometimes it is unnecessary to use the core insulation, so that the rewinding insulation and banding material only are required.

In order to present the information so that the repairman can see its proper location in the winding a diagram and halftone are used as illustrations. The numbers for the parts in the illustrations will enable the reader to follow the description more intelligently.

CORE INSULATION

Item 1.—Ninety-six tan-treated* cloth caps, 0.010 in. thick cut in 8 sections from a circular piece, 12 in. inside diameter and 18½ in. outside diameter. Each section has four fingers cut 1½ in. deep from the center. These caps are placed against the end bell in three layers; each layer is four strips deep. They are held against the end bell by tan tape, Item 2, which is used to cover the coil supports. On high-voltage motors micarta molded strips are used to cover the coil supports and end bell.

Item 2.—Three rolls of tan-treated cloth tape, bias cut. This tape is used to cover the coil supports and holds the tan-treated cloth caps.

WINDING INSULATION

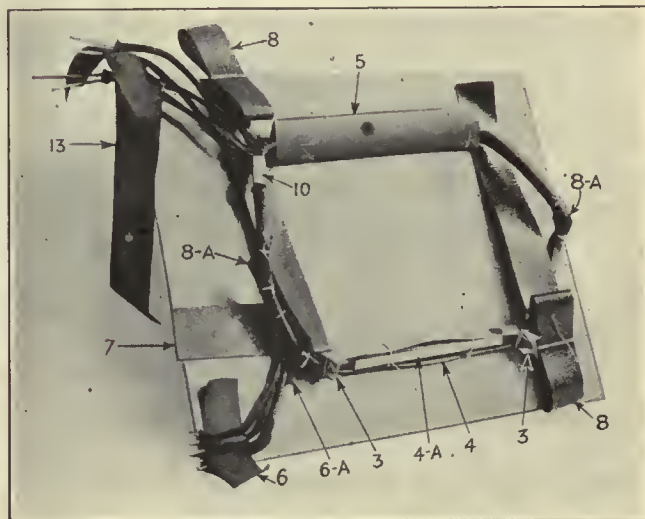
Item 3.—Fifty-eight fishpaper U-pieces, 0.056 in. x 3½ in. x ⅞ in. grooves are provided in both ends of the slot in the armature core for fishpaper U-pieces. These U-pieces protect the ends of the coils where they leave the slot.

Item 4.—Twenty-nine fishpaper cells for bottom coil, 0.023 in. x 2 in. x 10 in. Separate cells are used for the coils in the bottom of the slot. This cell is placed over the coil and driven into the slot with the coil.

Item 4-A.—Twenty-nine fullerboard pieces between top and bottom of coils, 0.030 in. x ½ in. x 6 in. This strip separates the top and bottom coils in each slot.

Item 5.—Twenty-nine fishpaper cells for top coils, 0.023 in. x 4½ in. x 10 in. This cell is large enough so that it extends above the laminations. A separate cell is used for the top coil so that if the top coil has to be repaired it can be done without disturbing the insulation of the bottom coil. When the top coil is replaced a new cell is used.

Item 6.—One strip of treated surgical tape, 0.023 in. x 2 in. x 42 in. This tape is woven between the bottom



Materials Used to Insulate Armature Coils

leads back of the commutator neck. It keeps the leads separated at this point.

Item 6-A.—Twenty-nine strips of treated oil duck, 0.035 in. x 1 in. x ¾ in. This strip is placed over No. 2 and 4 leads where they leave the front bottom corner of the coil. Leads Nos. 1 and 3 will lay on top of this strip. This separates the leads where they leave the coil, thus preventing the leads from shorting at this point because the leads form a double layer.

Item 7.—Twenty-nine strips of treated oil duck, tapered, 0.035 in. x 2 in. x 4½ in. short side, 6 in. long side. These strips are placed between the lower leads and the bottom half of the front diamond part of the adjacent coil. The tapered end is anchored and brought up between the bottom half of the two front diamond parts of adjacent coils. After the coils are laid and the bottom leads connected the ends of these strips are brought around the extreme end of the diamond and fastened with friction tape. This strip protects the bottom leads from the bottom of the adjacent coil besides separating the coils where they make the bend at this point.

*This is a trade name for tan-colored, oil-treated linen or other cloth.

Item 8.—Two strips of treated oil duck, 0.035 in. x $1\frac{1}{4}$ in. x 42 in. These strips are placed between the top and bottom halves of the diamond parts of the coil, for the front and rear of the armature. They serve to separate the top half of the diamond part of the coil where it crosses the bottom half of the diamond part of the lower coil, which is running in the opposite direction and is of a different potential.

Item 8-A.—Fifty-eight treated duck pieces, 0.035 in. x 2 in. x 3 in. These strips are placed over the drop loop of the diamond, both front and rear, where the top half crosses the bottom half of the preceding coil. It serves as a separator where the insulation is most apt to be damaged in winding.

Item 9.—This is a fiber wedge which fits over the coil in the armature slot.

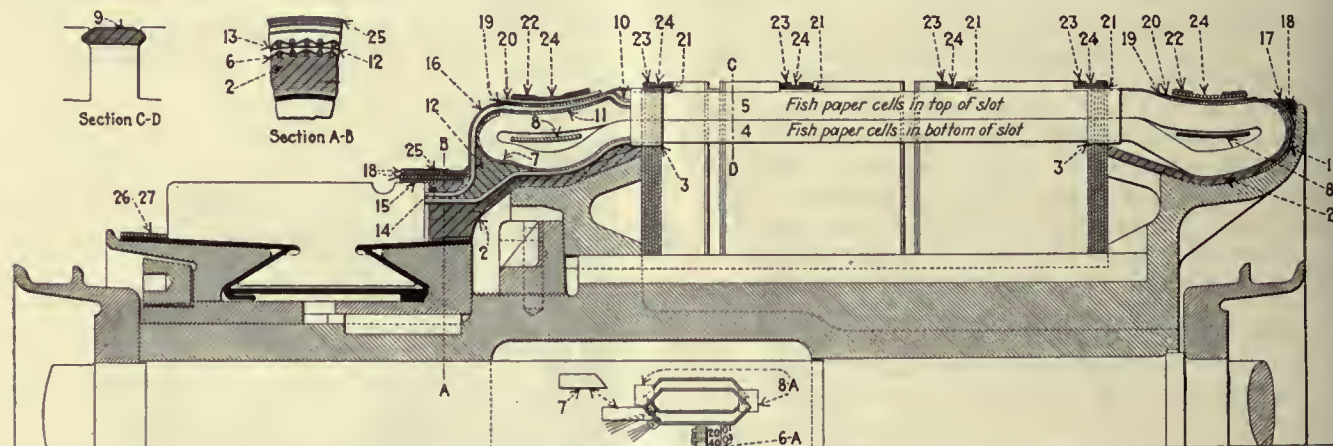
Item 10.—Twenty-nine strips of fishpaper, 0.015 in. x $1\frac{1}{2}$ in. x $1\frac{1}{4}$ in. These strips are bent to an L shape so that they will fit between the top halves of the front diamond parts of two adjacent coils. This strip in-

Item 16.—No. 49 drilling hood is placed over the mica strips which cover the commutator neck and is held in place by a layer of No. 12 thread, which is wound tight around the armature at this point and is painted with an air-drying varnish. It is then doubled back over the first layer of No. 12 machine thread. It is covered by a second layer, wound tight on the thread. This layer of thread should cover the drilling hood to the point where the leads bend up to go over the ends of the coil. The top lap of the coil is sewed.

Item 17.—One drilling hood, 0.017 in. x 9 in. x 48 in. The tan-treated caps (Item 1) are laid over against the ends of the coil and the one edge of the hood is firmly anchored by a tight woven band of No. 12 machine thread. The hood is doubled back over the coils.

Item 18.—Two hundred and fifty yards of No. 12 machine thread.

Item 19.—Two strips of fishpaper and mica, 0.012 in. x 2 in. x 96 in. After the temporary band, which was used to draw the ends of the coils down, is removed,



Types of Material Used for Rewinding Armatures

ulates the top leads where they cross the adjacent coil.

Item 11.—Friction tape to hold Item 7 in place.

Item 12.—Tan-treated cloth tape used as a filler.

Item 13.—Four strips of surgical tape (not treated), 2 in. wide x 0.020 in. This strip of surgical braid is woven alternately between Nos. 2 and 4 leads of each coil, as these leads are connected first, after which it is then wound once over the top of these leads next to the commutator, then woven alternately between leads 1 and 3 of each coil. This separates adjacent leads at the top with two layers of surgical braid. This is essential because the cotton insulation is scraped from the leads when they are tinned. It must be wound tight so that it will keep the leads firm. Some types of motors have the leads taped with friction tape.

BANDING MATERIAL

Item 14.—One-half pound of tan-treated cloth tape. This tape is used to cover the top leads. It must be wound tight so that it will hold the leads firmly, as vibration of the leads at this point may result in broken leads.

At this point of the winding the armature must be heated to 100 deg. C. and banded with temporary bands while it is hot, thus drawing the coils down firmly.

Item 15.—Seven strips of mica, 0.008 in. x 1 in. x 6 in. These strips are placed over the commutator neck to prevent the solder from flying out of the slots in case it melts. It is held in place by Items 16 and 18.

the drilling hood is drawn tightly over the coils. One strip of fishpaper and mica is placed around the hood.

Item 20.—Two layers of surgical tape, 0.020 in. x 2 in. x 4 in. A strip of surgical braid covers the fishpaper and mica strip. This braid is covered with a tight layer of No. 14 banding wire (Item 24), with twelve tin clips (Item 22) placed under the banding wire, the ends being bent over and soldered to the banding wire. The above outlined operations covering Items 19, 20, 22 and 24 are identical for banding over the front and rear coil support. The two outer core bands are used to anchor the ends of the front and rear drilling hood.

Item 21.—Four strips of sheet tin, 0.012 in. x $1\frac{1}{8}$ in. x 48 in. These strips of sheet tin are placed over the coils in the banding slot on which to wrap the banding wire (Item 24).

Items 22 and 23.—Tin clips. These tin clips are placed under the bands, bent over and soldered to the wire to keep the banding wire intact.

Item 24.—Wire used for banding.

Item 25.—Two layers of surgical braid wrapped tight and sewed in three places serve as a protection to the No. 12 machine thread (Item 18) against flashes.

Items 26 and 27.—Italian twine. One layer of four-ply Italian twine, saturated first with No. 3 and then No. 4 shellac and well ironed with a hot soldering iron after each application of shellac, makes an oil and moisture proof V-ring protection upon which a minimum amount of dust will adhere.

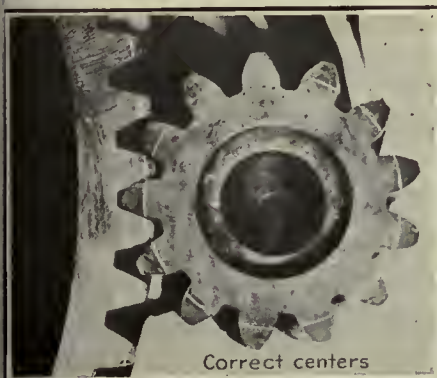
Excessive Gear Spacing Causes Trouble

Model Shows How Noise and Wear and Breakage of Teeth Follow
Rapidly with Increases in Distance Between
Centers of Gear and Pinion

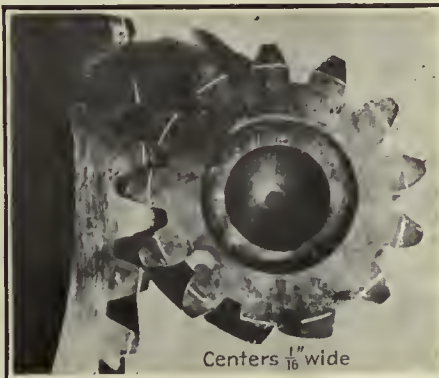
DURING the early days of electric railroading great efforts were made by motor manufacturers to design a motor whose armature could be mounted directly on the car axle. The purpose was to dispense with gearing, which in those days was a source of great expense as well as noise in car operation. These efforts to design a gearless motor have been given up, at least so far as car operation is concerned. It was found that the gearless motor has many serious objections, and as gear manufacturers have improved their product most of the defects experienced with the earlier gears

bearings which causes this spread of the gear and pinion can take place both in the bore of the bearing and on the outside of the bearing where it is held in the housing. Some wear is also possible on the inside of the motor housing, caused by a loose fit of the dowel pins or keys used to prevent the bearing from turning. There is also possible wear between the motor housing and the motor frame. It naturally follows that the distance of the spreading apart of gear and pinion is the sum of all the loose fits mentioned.

The bad condition brought about by too great spac-



Correct centers



Centers $\frac{1}{16}$ " wide

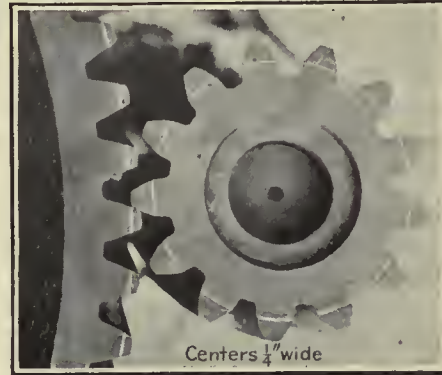


Centers $\frac{1}{8}$ " wide



Centers $\frac{3}{16}$ " wide

The Injurious Effects of Too Great Spacing of Pinion and Gear Are Clearly Indicated. Pitch Lines Are Shown in White. The Five Spacings Shown Increase by $\frac{1}{16}$ -In. Intervals from the Correct Position to $\frac{1}{4}$ In. Wide



Centers $\frac{1}{4}$ " wide

and pinions have disappeared. If properly run and protected from damage, the modern gear and pinion should have a long life and give very little trouble. If their operation is not properly supervised, however, the life which they should have is greatly shortened, and they are responsible for a great deal of the noise which comes from car operation. In other ways, also, they will not give the maximum performance of which they are capable.

The principal trouble from gears of proper shape and material and properly lubricated comes from too great spacing between the gear and pinion. As the armature and motor axle bearings wear, the spacing between the pinion center and gear center tends to become greater. In consequence, the teeth of the gear and pinion, instead of touching at the pitch line, come in contact only at the outer ends of the teeth, with resulting greater wear and noise from the backlash.

The wear of the armature bearings and motor axle

ing between gear and pinion is clearly illustrated in the accompanying five illustrations. They are from a series of photographs made by the R. D. Nuttall Company of a new railway gear and pinion set at different spacings. To bring out the injurious effect of improper spacing the Railway Improvement Company constructed a model, made up of a new gear and pinion mounted on a pedestal so designed that the space between the centers of the gear and the pinion could be set at various lengths by exact graduations of $\frac{1}{16}$ in. This model was shown at the Atlantic City convention. The gearing illustrated has a 13:74 ratio and a $4\frac{1}{4}$ pitch. The pitch line is shown by a white line marked on each tooth.

The first illustration shows the gear and pinion at the correct distance apart. In this position, as will be seen, the teeth engage at the pitch line. With this condition the white marks on the teeth of the gear and pinion in engagement make a practically continuous line.

The next view shows the centers of the gear and pinion $\frac{1}{8}$ in. farther apart, and in the third view the centers are another $\frac{1}{8}$ in. apart, or at a distance $\frac{1}{4}$ in. greater than in the first view. Already the teeth are shown to be beginning to engage at their outer ends only. This condition is still more marked, of course, in the fourth and fifth views, which shows the centers $\frac{3}{8}$ in. and $\frac{1}{2}$ in. farther apart respectively than in the first view. The engravings are about one-half actual size. In consequence, the spacing between teeth and gear centers are correspondingly reduced in the engravings over that in actual practice.

It is obvious from the view of the $\frac{3}{8}$ -in. wide centers that the teeth are engaging on only a very small portion of their wearing surfaces, and that if operations under these conditions are continued for any considerable length of time the natural result would be for the teeth to lose their original shape. It is also clear that all of this wear is coming at the ends of the teeth and that only one tooth on the gear and one on the pinion are in contact for any considerable part of the time, whereas in the view of the correct spacing two sets of teeth are in engagement for most of the time.

A condition like that in a $\frac{3}{8}$ -in. wide spacing will not continue long until the teeth will begin to lose their proper shape and it will be necessary to discard them. There will also be a great increase in noise, especially as the car speed changes during a run, as there is a great deal of backlash to take up when a change in the speed of the car makes the change from engaging on the front of the teeth to engaging on the back of the teeth, or when the direction of rotation of the motor is changed. There is danger also, under such conditions, that the teeth of gear or pinion or both will become broken because of the great impact between teeth combined with a small area of bearing surface.

Clearly, the correct way of gear operation is when the gear and pinion mesh as shown in the first illustration. This condition should be approximated as closely as possible by keeping the tolerance allowed for the fit of the bearing on its shaft as small as possible. This condition can be maintained only by measurement of the wear in the bearings and associated parts at more or less frequent intervals, depending upon their wearing qualities and the quality of lubrication supplied to them. A slight increase in the distance between centers may not seriously affect the proper shape of the gear teeth, but it is doubtful whether the allowance of $\frac{1}{8}$ in. permitted under the rules of the American Electric Railway Engineering Association is not too great. The London Underground Railway is said to work to $\frac{1}{16}$ in. clearance.

Clearances between shafts and bearings should not only be kept very small, but constant attention should be given to keeping bearings tight in their housings and housings tight in motor frames. Omission of this precaution, as already stated, permits spreading of gear and pinion centers.

When new bearings are installed, the caps should be pulled up tight and steel feelers applied between the cap and the brass to see that the bearings actually are tight. Still another way of determining whether they are tight is to apply the air brake, then turn the controller to the first notch for a moment. If the brasses move they are not tight.

Present-day practice seems to be not to give as much attention to the axle bearings as to the armature bearings, so conditions at the axle bearing fits are more

likely to be neglected. Nevertheless, axle bearings are subject to greater wear than armature bearings because there are no springs between the axle bearings and the track and the pounding they get is harder. Moreover, water from the street is much more likely to get into the axle bearings than into the armature bearings. Still another point, and one of great importance, is that in the axle bearings the openings or windows for waste usually are larger in proportion to the surface of the bearings than they are in the armature bearings. Here are a number of very good reasons for very careful watching of axle bearings in motor inspection.

The destructive results of too great a spread and loose brasses are so insidious that it would be desirable on any property where the conditions are not positively known to have a check made right away. Even where it is thought the conditions are good, a check test may be worth while. As an example of how much wear sometimes comes, measurements will be quoted of wear observed on four axle bearings recently taken from a 40-hp. motor used in city service. The following amounts of wear were found:

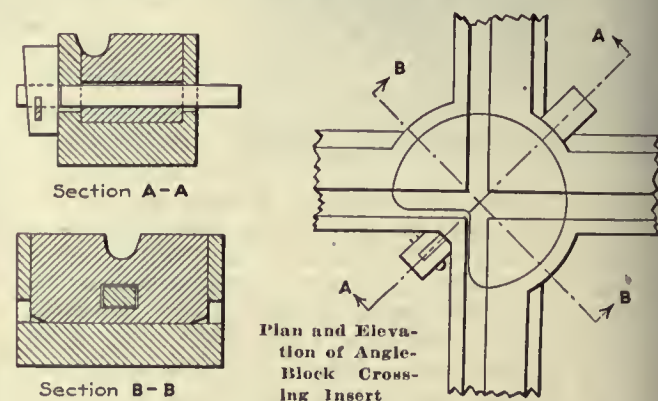
Flange Wear	Wear in Bore
One bearing, $\frac{1}{8}$ in. wear	One bearing, $\frac{1}{8}$ in. wear
One bearing, $\frac{1}{4}$ in. wear	One bearing, $\frac{1}{4}$ in. wear
One bearing, $\frac{3}{8}$ in. wear	One bearing, $\frac{1}{2}$ in. wear
One bearing, $\frac{1}{2}$ in. wear	One bearing, $\frac{3}{4}$ in. wear

The figures given above are of wear only in the axle bearings. If to this wear is added that in the armature bearings and in the housings, the particular motor mentioned must have had considerable spread.

Crossing Insert Shaped to Hold Position

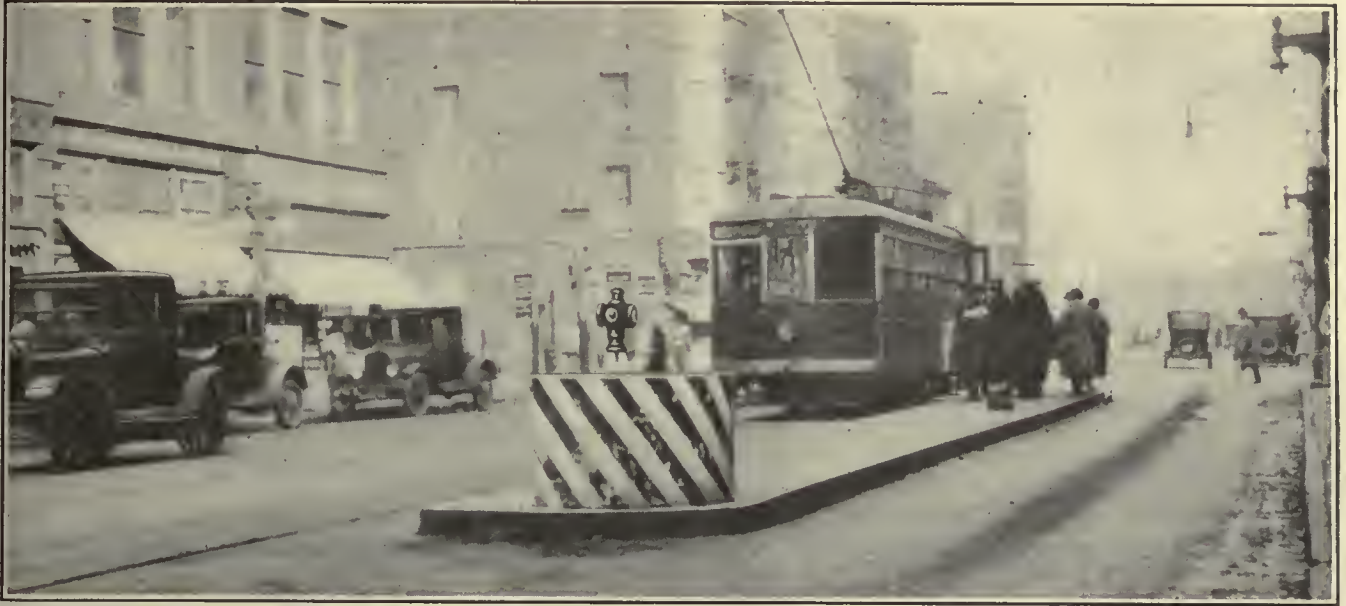
AN ANGLE-SHAPED hard center insert for crossing frogs has recently been designed by J. H. Asselin, engineering and construction department, Market Street Railway, San Francisco. A tapered key extending through the side walls of the casting and through the block itself holds it solidly in position. This key is held in place by a wedge through the end of the key.

The block itself resembles a cylinder, one-quarter of which has been removed. The angle thus formed



fits into the inside angle of the intersection, where there is no wear. Due to this right angle, it is impossible for the block to shift. The alignment is thus kept true at all times and the block cannot rise or buckle.

The angle block has the thickness of approximately two-thirds of the depth of the casting. The block is cast-steel and specially heat-treated to resist shock. When worn down this block can either be built up by welding or the block itself can be removed. If desired, both the crossing and block can be made of manganese.



Safety Zone with Raised Platform Recently Installed in Terre Haute

Substantial Safety Zones Constructed in Terre Haute

Curved Concrete Guards Reinforced with Old Rails
Afford Protection to Waiting Passengers—Cast-
Iron Buttons Fastened to the Pavement
Mark Limits of Zone

By D. H. WALKER

Assistant Engineer Terre Haute, Indianapolis &
Eastern Traction Company

DURING the past year the Terre Haute, Indianapolis & Eastern Traction Company constructed several cheap but effective safety zones on Wabash Avenue, the main street of Terre Haute, and part of the National Old Trails Highway. This national road carries a heavy stream of cross-country tourists all the year around. In addition, the majority of the large retail stores in the downtown district are on Wabash Avenue and the vehicular congestion made safety zones necessary to protect people boarding street cars.

The first zone was installed as a raised platform at the corner of Wabash Avenue and Seventh Street, the busiest corner in town. As the street was 50 ft. wide between curbs there was approximately 18 ft. left from the rail to the curb. The platform was made 80 ft. long and 4 in. high above the brick pavement and 5 ft. wide, with its inside edge 18 in. from the rail. This provided enough length for unloading three Birney cars at once. A quarter circle concrete guard was placed at the end, and back of this guard was placed a concrete lamp base surmounted by an ordinary switch lamp with red lenses.

To prevent the guards at the ends of the zones being knocked over by a careless motorist, when the concrete was poured half a dozen old rails about 4 ft. long and extending down through the paving base were included

for reinforcement. Guards were made 3 ft. high, 1 ft. thick, with a 3-ft. outside radius. In order to provide a hub guard the outside edge of the quarter circle was placed 6 in. inside the edge of the platform. The platform itself was poured directly on top of the brick paving, after taking out a zigzag row of bricks as a means of forming concrete lugs monolithic with the platform. A row of brick was removed at the inside edge of the platform toward the crown of the street to prevent seepage under the platform. To keep the concrete from chipping off an old three by three angle iron was used all the way around the edges and held by darts welded into the angle and extending diagonally down into the concrete.

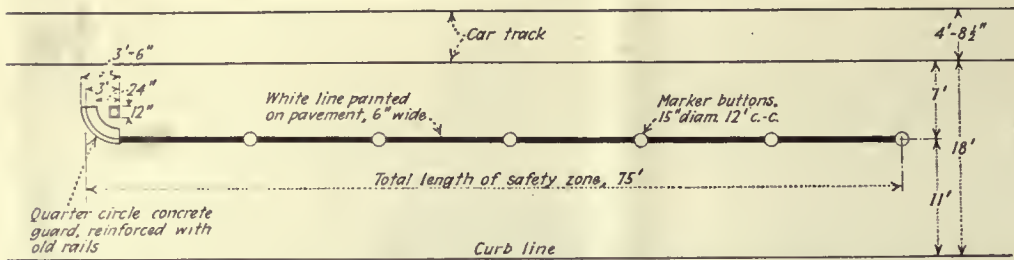
It soon was found that the quarter circle guard prevented accidents that even the raised platform could not have stopped. Accompanying illustrations show a few of the dents put in the guards by careless or inebriated motorists. Several arrests of drunken drivers have resulted from these attacks upon the zones, but up to date no one waiting in the zones has been injured and the guards themselves have suffered nothing worse than the chipping off of a little concrete.

After a few weeks trial of this first zone it was decided to install three more. These were not of the platform type, but had the zone line marked on the street with cast-iron buttons and white painted lines. However, the same safety feature was provided by quarter circle concrete guards as used with the platform. These isolated guards also had the 6-in. hub guard with an angle iron forming the edge. This angle iron was extended the whole circumference and was welded at the corners to prevent loosening. Darts welded to the angle and extending into the concrete also helped hold this.

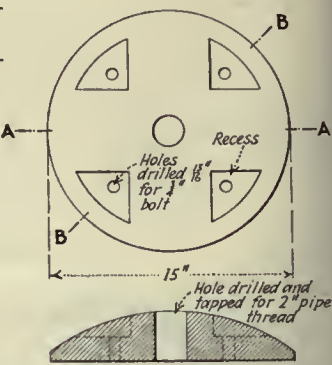
Bricks were removed under the whole guard and concrete poured to the paving base. Reinforcing



Reinforced Concrete Guard at End of Safety Zone—Cast-Iron Buttons and White Lines on Pavement Mark Limits



Above, Arrangement and Location of Safety Zones with Relation to the Curb and Track. At Right, Cast-Iron Button Marker Used by Terre Haute, Indianapolis & Eastern Traction Company for Safety Zones



rails went through the paving base as before. On these later zones two were equipped with switch lamps and one was installed with a flashing safety zone warning as furnished by the American Gas Accumulator Company. The guards on all safety zones were painted with diagonal 6-in. stripes of alternate black and white.

In the use of buttons to outline these zones it was necessary to design a special type and have a pattern and castings made to order. The Board of Works and the city engineer thought that posts connected by a chain would be necessary. They were willing to try first without the chains, however, if provision were made to install them in case it was deemed necessary later. The company felt that the chains were undesirable and accordingly used a button as shown by the accompanying sketch. This was fastened with four 3/4-in. bolts on the corners in recessed notches. Holes were drilled in the paving for these bolts and they were set in cement grout. A hole through the center of the button was drilled and tapped for 2-in. pipe thread in order that posts could be placed in these holes later. While in use without posts the holes were filled by pipe plugs, a countersunk plug being used to minimize danger of tripping on the buttons. After a thorough trial it was found that the posts and chains were not necessary as the quarter circle guard furnished all the protection needed against motorists with inclinations to ramble through the zones.

terminal at Chambers Street and the Interborough's two City Hall elevated stations and Brooklyn Bridge subway station. At the Brooklyn Bridge center there were 53,983,558 passengers in 1925, as against 53,885,798 in 1924, a growth for this center of only about 97,000.

Another great center of rapid transit traffic is at Union Square, Manhattan. There is one station of the Interborough at Union Square and two B.-M. T. stations, one of them on the Fourteenth Street-Eastern line, which was first placed in operation on June 30, 1924. The Interborough at Union Square had a traffic of 20,508,136, or an increase of approximately 900,000 over 1924. The B.-M. T. traffic was 19,690,245, or an increase of approximately 1,500,000. The total traffic for the center was 40,198,381, or a growth for the year of more than 2,350,000.

At Grand Central station, which is the station of second importance on the Interborough lines, 37,234,126 nickels were paid, as against 35,864,163 in 1924, a growth of 1,369,963, a rate of increase somewhat less than in the year previous. The Pennsylvania station, the third in importance in the Interborough system, with 32,073,801, had a growth of 1,922,771, or slightly less than the rate of increase in the previous year.

Figures for important Interborough stations follow:

	1925	1924
Times Square.....	39,493,384	37,594,661
Grand Central.....	37,234,126	35,864,163
Pennsylvania Station.....	32,073,801	30,151,030
Fourteenth Street (East Side line).....	20,508,136	19,636,487
Atlantic Avenue (Brooklyn).....	16,952,648	16,703,450
Brooklyn Bridge.....	15,714,454	15,673,611
Fulton Street (East Side line).....	14,157,961	14,010,247
Borough Hall (Brooklyn).....	13,414,219	13,640,702
Fourteenth Street (West Side line).....	12,419,299	12,304,865
86th Street (East Side line).....	11,406,290	11,267,689

On the Interborough subway system the local station of heaviest traffic, that is, a station served only by local trains, is that at 50th Street and Broadway, where there were collected in 1925 9,902,832 fares, or an increase of a little less than 300,000 fares for the year.

The most important traffic stations of the B.-M. T. subway and elevated lines are indicated as follows:

	1925	1924
Times Square.....	26,064,283	22,793,888
34th Street.....	21,853,851	19,163,092
Union Square.....	19,960,245	18,195,263
Coney Island terminals (Brooklyn).....	16,825,685	14,932,523
Essex Street.....	15,815,237	14,200,520
Chambers Street (Municipal Building).....	15,336,469	15,212,858
Corlandt Street.....	13,891,455	12,626,451
Brooklyn Bridge ("L").....	12,970,766	12,840,666
De Kalb Avenue (Brooklyn).....	11,971,464	12,141,732
23d Street.....	10,807,254	10,064,998

It will be noted that Essex Street passed Chambers Street during the year and Cortlandt Street passed Brooklyn Bridge.

New York City's Greatest Traffic Points

SUBWAY stations of the Interborough Rapid Transit Company and the New York Rapid Transit Corporation (B.-M. T.) at Times Square, Manhattan, remain the greatest traffic points upon their respective systems and constitute New York City's greatest rapid transit center. This is the conclusion drawn from the Transit Commission's annual compilation of figures of ticket sales at various stations upon the rapid transit lines made public recently.

During the fiscal year ended June 30, last, the Interborough collected 39,493,384 fares at Times Square, while the ticket collections at the B.-M. T. stations were 26,064,283, a total of 65,557,667 fares collected, as against 60,388,549 in 1924, a growth during the year of more than 5,000,000.

The figures show that Times Square as a rapid transit traffic center is further ahead of Brooklyn Bridge than last year. The center shifted two years ago. Last year Times Square increased to approximately 7,000,000 ahead of Brooklyn Bridge, and this year it is approximately 11,000,000 ahead. The total at Times Square includes the fare collections, as has been stated, at the Interborough and B.-M. T. stations, while at Brooklyn Bridge the total embraces fare collections for the Bridge station of the Brooklyn elevated lines, the B.-M. T.

Combination Locomotive-Car Developed in Switzerland

Twelve-Wheel Vehicle Consists of a Six-Wheel Passenger Coach Permanently Coupled to a Six-Wheel Motive Power Unit—Unusual Safety Devices Are Provided



Combination Twelve-Wheel Locomotive-Car Used in Switzerland on Runs Where Traffic Does Not Justify Regular Train Operation

FOR service during slack periods when a long train is unnecessary, a combination locomotive and passenger coach is used by the Lötschberg Railway, which operates the section of the Swiss railways between Berne, Lötschberg and the Simplon. The new coaches are somewhat similar in design to those supplied by the Oerlikon Company in 1921 to the Burgdorf-Thun Railway. Electrical equipment is concentrated on a truck fitted with a leading axle and two driving axles, this truck being coupled to the main frame carrying the passenger and luggage compartments.

All the electrical equipment is in the locomotive portion. Current, single-phase 16 $\frac{2}{3}$ period at 15,000 volts, is fed from the overhead collector device through isolating switches to the main current breaker, which is constructed for outdoor mounting. The circuit breaker is arranged for electro-pneumatic closing and for automatic electric release. A second pole of the circuit breaker is connected to the high-tension terminal of the transformer. The latter is of the oil-immersed, self-cooled type. In order to improve the cooling the transformer is inclosed in a second casing, into which

air is drawn through the roof, passing over the transformer and escaping into the motor room.

The low-tension winding has eleven tapings which are connected to the motor as required for the various speeds, the highest voltage supplied to the motor being about 500. Connection between transformer tapings and motors is insured by means of twelve contactors that are controlled electro-pneumatically and are interlocked to prevent short circuits. They are arranged in the motor room. Passage from one notch to the next is insured without breaking the circuit in the usual way by means of a bridging coil.

Development of an hourly output of about 500 hp. at the wheel tires at a speed of 35 km. per hour (21.7 m.p.h.) was a requirement of the design. Another was that the motors should be as similar as possible to the spare motors kept on hand for the other electric engines of the company in order that they can be used in case of emergency. In view of this it was decided to adopt motors of the type supplied by the Oerlikon Company to the Bernese "Decree" railways that have been in successful use for a period of five years.



Motorman's Cab in Locomotive End of Combination Unit. Safety Devices Are Controlled by a Pedal and a Push Button

Each motor has ten poles, an actual one hour rating of 518 hp. at 21.7 m.p.h. and a continuous output of 425 hp. at 24.2 m.p.h. The highest speed is 40 m.p.h. The two driving axles are coupled together by means of a triangular system of rods and connected to the motor through a jackshaft. In this way it has been possible to use not only motors similar to those of the locomotives referred to but also the same gearing. Driving wheels are 4 ft. 4 in. in diameter, the gear ratio being 1 to 3.78. The controller is mounted on the motor frame, together with a fan set. The latter draws air from the motor room and drives it through the motor

and out through the openings below. Multiple control and automatic acceleration are provided.

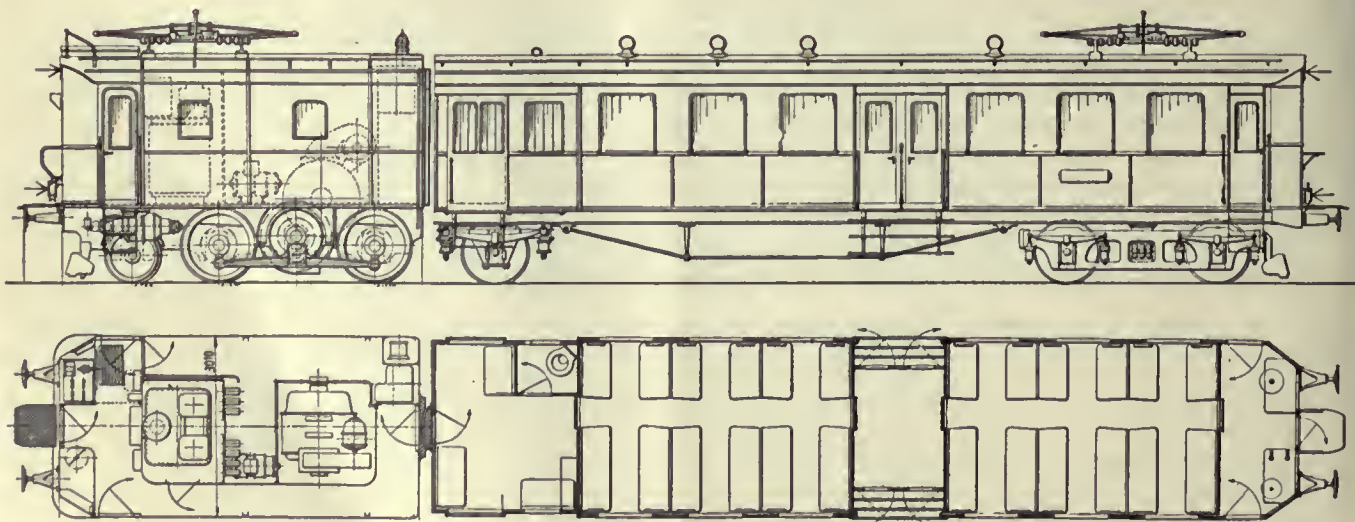
As they are intended for one-man operation, the cars have "dead man's" safety devices. Instead of having the safety device on the operating handle of the master controller, it is connected with a pedal which is depressed by the driver during the operation of the motor coach. When the pedal is released the motor circuit opens after a given interval, and the brake is brought into action by a relay. Within this interval, however, if the driver presses a push button mounted on the other side of the driver's cab, the switching off and braking is prevented. This arrangement was adopted to facilitate shunting operations, as the driver must under those circumstances be able to look out from one side of the cab or the other.

In order to permit of the vehicle being operated in either direction, the passenger coach is also provided with a driver's cab at the end away from the locomotive. Both the coach and the engine portion are provided with current-collecting apparatus.

Direct current at 36 volts for the control circuits and lighting is supplied by a 1-kw. motor-generator set and a battery of accumulators. Heating current for the different compartments of the coach is derived from the train heating bus lines. These are connected to a tapping of the transformer, giving 1,000 volts through an electro-pneumatically operated circuit breaker. The heating current for the driver's cab is obtained from the same supply system as the auxiliaries, such as the compressor set for the brake and the control gear. This supply system is connected to the 220-volt tapping of the transformer.

The coaches are each adapted to carry 60 passengers, although at times of heavy traffic five sitting and fifteen standing passengers can be accommodated in the luggage compartment. Over-all length of the engine proper is 21.6 ft. and of the complete vehicle 71 ft. 8 in. Total weight of the motor coach is 60.1 tons, of which the electrical equipment is responsible for 15.4 tons.

The vehicles were the joint production of three Swiss concerns, the Oerlikon Maschinenfabrik being responsible for the whole of the electrical equipment, the Swiss Locomotive & Machine Works, Winterthur, for the chassis and underwork, and the Swiss Industrial Company of Neuhausen for the body work.



Elevation and Floor Plan of Lüttschberg Railway Locomotive-Coach. Seats for 60 Passengers Are Provided in the Main Compartment, with Fifteen Additional Seats in the Luggage Room

When Should Pinions and Gears Be Removed for Tooth Wear

By E. S. Sawtelle

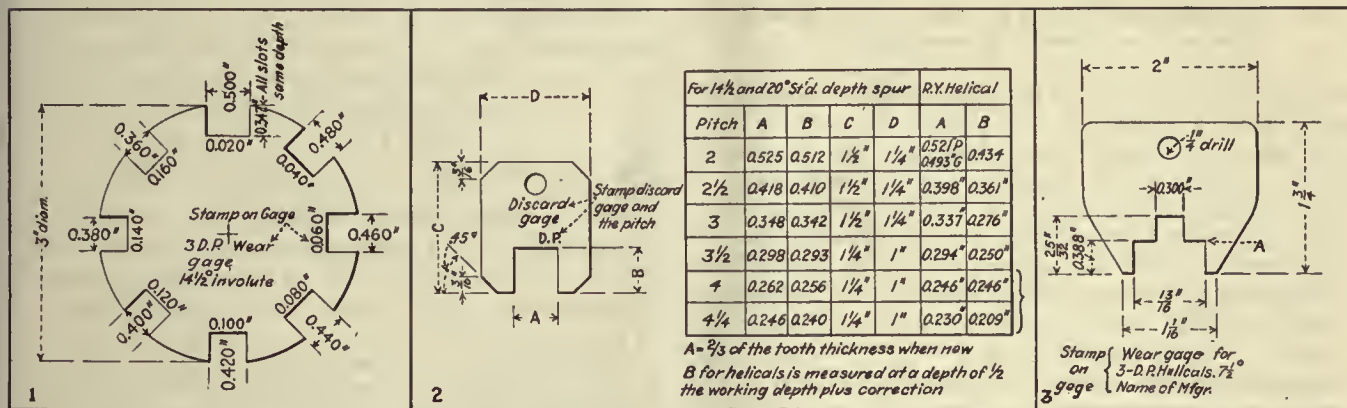
Assistant General Manager Tool Steel Gear & Pinion Company,
Cincinnati, Ohio

Gages Can Be Used Successfully on a Large Majority of Present-Day Gears and Pinions to Determine When Teeth Are Worn Out—A Few Abnormal Cases May Require Special Consideration

PRESENT practice of leaving to the judgment of inspectors the decision as to when a gear or pinion should be removed as having finished its useful life is unsatisfactory. Most superintendents of equipment and master mechanics would welcome some sort of a gage to decide when gears and pinions should be scrapped, but they seem to feel that the variety of tooth shapes and differences in gear ratios offer obstacles that prevent the use of a satisfactory gage. A study of

This can be applied to any type of three-pitch pinion. The slots of this gage are all of the same depth and are equal to the corrected addendum for the pitch, but the width of each slot in the gage is varied so as to measure all the way from a new tooth to one worn out by progressive steps of 0.020 in. This gage should prove very handy for determining approximately how near worn out a pinion may be.

A discard gage is shown in Fig. 2, which can be used



Note: all gages of $\frac{3}{16}$ " cold rolled steel, case hardened.

Note: For helical pinions 4 D.P. and 4 1/4 D.P. use gage C-144

Fig. 1—Wear Gage for Three-Diametric Pitch Gearing. This Provides for Gaging Wear Every 0.020 In.

**Fig. 2—Discard Gage for Brown & Sharpe
14½-Deg. Teeth to Measure
Worn Condition**

Fig. 3—Discard Gage for Gearing with Long and Short Addendum Teeth, Helical Teeth and the Wisdom Tooth Pinion

the subject, however, shows that gages can be used successfully on the great majority of gears and pinions to determine when they should be removed. An occasional gear or pinion may wear abnormally, due to misalignment, bad bearings or some other condition. In such cases the tooth may be very badly worn at the top and thoroughly fit for rejection, though it may not show much wear at the gage point. Judgment must be used in connection with the gages to safeguard against a condition of this kind.

In order to illustrate the problems that are encountered in gaging gear teeth for wear, and also as a suggestion for types of gages that appear to be satisfactory for determining when gears or pinions should be scrapped, I have outlined in the accompanying diagrams several gages that should be of assistance to inspectors.

Where the standard Brown & Sharpe 14½-deg. gear or pinion is used wear at the pitch line can be determined by a simple snap gage which measures the wear from the top of the tooth to the pitch line. Fig. 1 shows such a gage, which can be read quickly and should be useful.

readily on a Brown & Sharpe 14½-deg. tooth for measuring a worn-out gear or pinion. The dimension of A for the thickness of the tooth is usually taken as two-thirds of the original thickness at the pitch line of a new gear or pinion.

For a diametrical pitch of three this would be two-thirds of 0.523, or 0.348 in. The dimension B for the depth is the corrected addendum, which for a three-pitch pinion of about 14 to 17 teeth should be 0.345 in. This corrected addendum varies slightly with the number of teeth, but a gage for a depth of 0.345 in. can be used for any gear or pinion with a negligible error.

Several of the more modern tooth shapes depart from the Brown & Sharpe standard and have higher pressure angles. These include the long and short addendum tooth, the helical tooth and the wisdom tooth pinion. Originally these teeth are cut broader at the base and narrower at the top, with the result that frequently they may wear to a knife edge at the top before they are sufficiently worn at the center of the tooth to warrant discarding. Such a condition is shown in Fig. 4, to-

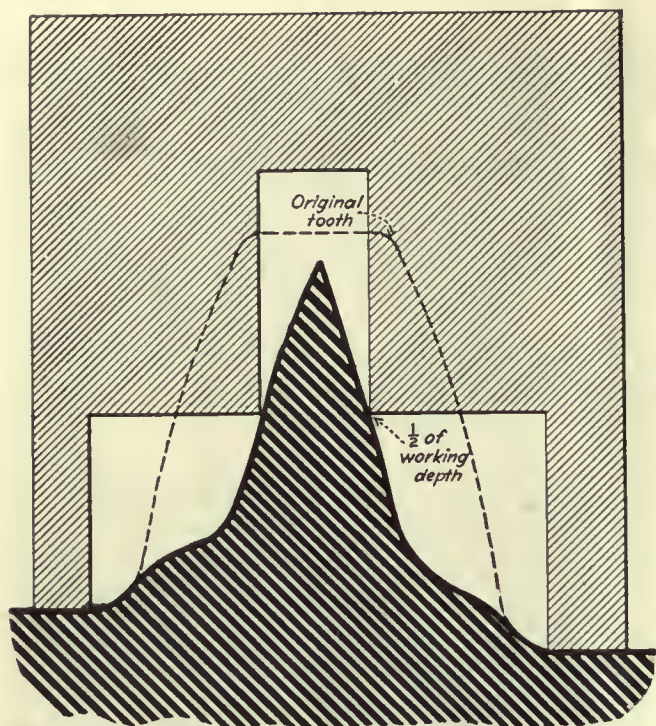


Fig. 4—Gearing with High-Pressure Angles Frequently Can Be Worn to a Knife Edge at the Top Before It Is Sufficiently Worn at the Center to Warrant Discarding

gether with an outline of the general type of gage that could be used to meet this condition. The gages shown in Figs. 1 and 2 cannot be used safely after the gear or pinion is worn to a knife edge. For such conditions a type of gage shown in Fig. 3 is recommended. This takes its height bearing from the root of the tooth. In this gage the offset at A is half way down the working depth of the tooth, and the thickness measured at this point is that at which the gear or pinion should be rejected. This is recommended to be two-thirds of its original thickness at point A. The vertical legs of the gage are of such length as to make the gage point A bear at the center of the working depth. The inside slot of the gage is such as to provide a clearance over the top of the tooth. This gage cannot be made universal, but a separate gage must be made for the gear and for each pinion with a different number of teeth. Likewise, an exact formula cannot be offered since there are variations used in the height and depth of the teeth for various types of gearing. The simplest method of getting dimensions for such a gear is to obtain exact data from gear manufacturers for the specific type of gearing used and make up a gage to suit individual ideas as to the degree of wear permissible before rejection.

During 1925 the number of accidents on the lines of the International Railway, Buffalo, N. Y., decreased 7.2 per cent. Serious accidents fell off even more, as shown by the fact that 10.28 per cent fewer persons were injured. During the *Courier* campaign against safety zone violators, I. R. C. employees turned in to the police 1,044 reports covering 1,235 violations of the ordinance establishing a 7-ft. safety zone around standing street cars. The campaign has greatly lowered the risk of accident to pedestrians and to passengers. A flashing signal was installed at Union Road on the Lancaster line and a new improved block signal system on the Buffalo-Niagara Falls High Speed line.

The Readers' Forum

Noise Reduction Should Pay Well

WISCONSIN VALLEY ELECTRIC COMPANY

WAUSAU, WIS., Feb. 9, 1926.

To the Editor:

Several very inspiring articles have appeared in the *ELECTRIC RAILWAY JOURNAL* of late, and no doubt they have been read with a great deal of interest by many men in the industry who are constantly trying to improve service in their different localities.

The reply to "Master Mechanic" by the chairman of the noise reduction committee is very appropriate indeed, and I believe this committee deserves the support of the entire industry and should be encouraged rather than discouraged. There will, of course, always be with us the man who is ready to throw cold water on any proposition, but fortunately those men are in the minority, and the committee should know this.

It is very gratifying to read the letter by Clinton D. Smith, who certainly takes a very optimistic view about the future of our industry, and we must agree that he is right when he states that the car is our show window and it is through the pleasing appearance as well as comfortable, speedy and safe transportation that we will get our message across to the public, and that only in this way can we expect to get patrons enough to make our industry profitable. "Master Mechanic" wonders where the money to improve equipment is to come from. It is by the improvement of equipment and track that patronage is going to be increased, but occasionally we find some executive who thinks he must either curtail service or cut down the appropriation for maintenance of equipment as soon as the seasonal drop in patronage occurs.

Such men are losing track of the fact that we are at a dawn of a new era in transportation. The standard of living in our country, we are told, is constantly ascending to higher levels. If that is so it holds true equally well in transportation. We cannot expect that people are going to ride in dirty, dilapidated cars, many of which are equipped with hard slat seats. Instead we must be up to date and offer them an attractive ride, on full spring cushions, in cars which are clean and attractive, not necessarily luxurious. The bus properly co-ordinated with railway service should provide our service de luxe at proportionately higher rates than we are now getting for electric car service.

A word in regard to noise. Our old, heavy equipment was very noisy. It was also clumsy and was not economical to operate. We found that we could operate cars of lighter weight with quite a saving, but most of us went to extremes in lightness. Certainly the safety car has not proved less noisy than the old heavy equipment previously operated.

Within the last few years the car builders have brought out cars which they believe—and I think they are right—would strike a medium between the old heavy equipment and the too light safety car. This medium-weight double-truck car has met with favor among the operators as well as the riding public. It has a much more pleasing appearance, is more comfortable and speedier. Certainly the noise is considerably reduced and the cost of operation less.

The reduction of noise can be extended to the track structure as well as to the rolling stock. The more resilient the track structure the less noise will be noticed, and I believe that in all future trackwork, either new or reconstruction, serious consideration should be given to materials now on the market which have been proved to make the track resilient, and without movement enough to disturb pavement in the track area. On test track in different localities resilient construction has proved very popular.

The Wisconsin Utilities Association has a railway fellowship at the University of Wisconsin. The young man who is taking the course this year was given as his subject to study, "The reduction of noises in equipment." A committee of three operating men was appointed to confer with this young student and to guide him. He is free to call on any of the operators at any time for information which will help him in his work, and I have no doubt that when he makes his report next summer it will be of great benefit not only to us here in Wisconsin but to the entire industry.

I feel that the industry ought to get behind the committee on noise reduction and give it the support it so well deserves.

I have just read the address delivered by Mr. Budd at Indianapolis, and if all utility operators would look at the future as brightly as Mr. Budd does there would be no cause for worry, as every man would then be up and doing all the time.

NELS C. RASMUSSEN,
Superintendent of Railways and Chairman Railway Section
Wisconsin Utilities Association.

Additional Information Concerning Number
of Employees in Seattle

SEATTLE, WASH., Feb. 5, 1926.

To the Editor:

After reading the editorial in the Dec. 12, 1925, issue of ELECTRIC RAILWAY JOURNAL entitled "Cold Comfort for Municipal Ownership Advocates in Seattle Experience," I wish to call your attention to certain features of the situation not mentioned in that article. Acquisition of the street railway lines by the city occurred in April, 1919. Prior to this acquisition the total number of street railway employees was 1,876.

EMPLOYEES IN SERVICE OF SEATTLE MUNICIPAL STREET RAILWAY			
	April 1, 1919*	April 1, 1920	Dec. 1 1925
Transportation: Dispatchers, schedule clerks, inspectors, starters, and station masters.....	39	44	30
Office.....	15	36	17
Trainmen.....	1,289	1,439	1,220
Shops and carhouses.....	325	461	287
Way and structures.....	169	234	285
Accounting.....	39	40	36
Accounting, stores department.....	†	26	16
	1,876	2,280	1,891

* Figures under April, 1919, include employees of the traction company and city employees engaged in operation of a municipal car line.
† The number of employees in the storeroom of the accounting department of the traction company not known at this time.

This figure includes those engaged in the operation of a municipal car line. Between April 1, 1919, and April 1, 1920, the number rose to 2,280. On March 22, 1920, a reorganization occurred which created a railway division of the public utility department. When this reorganization was completed and put into effect the services of 236 employees were disposed of. Due to further economies and reductions since that time, we had in our employ on Dec. 1, 1925, only 1,891. During the

time that this reorganization has been in effect we established the basic eight-hour day. We allow the trainmen one day off in eight on their own time and have increased the number of car-hours on account of the installation of bus service in different sections. At this time 55 per cent of our operation is one-man. When the city took over the line from the traction company there was only a very small percentage of one-man operation. A tabulation of the number of employees at different dates is given in the opposite column.

There is considerable discrepancy between these figures and those which you quoted in your editorial from one of the Seattle newspapers. I thought you would be interested to know of this difference and to publish a correction.

D. W. HENDERSON,
General Superintendent.

Payroll Time Not Running Time

Feb. 15, 1926.

To the Editor:

In your issue of Jan. 30, page 195, there is a letter to the editor headed "Buses Faster than Electric Cars in New York." The writer bases his conclusions on a comparison of vehicle-miles and vehicle-hours, including layovers and delays. This is an error which is often accepted from statistical data and yet it is no true showing of the speed of a company's cars. Actual speed is determined by the average running time between terminals, excluding layover time and all other payroll time such as that allowed for reporting, turning in, meal relief, making out reports, etc. I do not know if the New York figures would show if it were possible to exclude these items from the New York Transit Commission reports showing car-hours, which generally mean payroll hours. I might mention in this connection that on certain properties the excess time is considerable, going to as much as 20 per cent over and above that spent in operating cars between terminals.

FAIR PLAY.

Credit Union Organized in Atlanta

GEORGIA already has one credit union, the Public Service Credit Union, which recently began operations under the auspices of the Georgia Railway & Power Company in Atlanta. A charter was secured by this union and organization was effected on Jan. 12, with an initial membership of 30, a stock subscription of 137 shares, at \$5 a share, and excellent prospects for work among the 5,300 employees of the company.

The entrance fee has been placed at 25 cents and a member can start in it by taking out a single share. No member can hold more than 100 shares of stock, and no member can have more than \$500 in stock or cash on deposit.

Two kinds of loans are made—a "character" loan and an "indorsed" loan. The character loan may run as high as \$50 and is made, in the judgment of the credit committee, on the character of the applicant. This provides for emergency cases when an employee needs money quickly and cannot offer security for it. The indorsed loan may run to as high as \$250, but must bear the indorsement of other members of the organization or some responsible person. These two types are expected to take care of the loan end.

A special feature will be the savings bank, which will lend out money at 6 per cent and pay 4 per cent for deposits, the difference of 2 per cent going to take care of the expenses of operation.

Equipment Maintenance Notes

Strengthening Fare Boxes During Repairs

PASSENGERS alighting from electric cars frequently find the fare box a convenient place to hang onto for support until the car stops. As a result the supporting side of the fare box is frequently subjected to severe strains. The Eighth Avenue Railroad, New York City, has had a considerable number of breakages of the metal on the supporting side of Johnson fare boxes along the top edge. In repairing these, C. P. Westlake, supervisor of equipment, has arranged a strengthening plate of steel $5\frac{1}{2}$ in. x 4 in. x $\frac{1}{2}$ in., which he installs and rivets inside to strengthen the point where failures occur. In order to provide a satisfactory and economical job several fixtures and jigs are used for the drilling and riveting operations in doing the work.

One of the accompanying illustrations shows the casing of three Johnson fare boxes; the one at the left in the illustration is a box before any repairs are made. This shows the breaking away of the metal at the top right hand corner. In repairing these boxes the first operation is to cut away the supporting side as shown in the center one of the fare boxes. The fare box at the right shows the finished job after repairs and reinforcement have been made. In order to hold the box in position after the side has been removed while work of drilling and riveting



Fare Boxes Before and After Repairs Have Been Made

At left, casing with broken supporting side. In center, the supporting side has been cut away while making repairs. At right, completed casing after repairs have been made.

is being done a clamp is placed around the box. A second illustration shows this clamp in position. It has a number of thumbscrews for adjustment and tightening. Another illustration shows the fixtures used for doing the work. In this view the jig at the left is for drilling the new side plates which are installed.

One of these plates is shown in the foreground of the illustration. The jig is made with two sides and the plate to be drilled is slipped between these and held firmly in position during the drilling operation. The reinforcing plate is shown at the extreme right in this illustration and a fixture for riveting in the background. This fixture is placed inside the box and, with the clamp shown in another illustration, makes firm support so that the riveting can be done satisfactorily. By this

method of strengthening the supporting side of boxes during repairs the number of boxes which require work to be done for breaking away of the supporting side has been reduced considerably.

Hinged Apron Permits Easy Repairs to Cars

IMPROVED appearance of cars is one of the important factors in the campaign of modernization with which electric railway operators are bringing back the business that is logically theirs. The smart street car today is wearing an apron. The old-fashioned car set high over the trucks and displaying a confusing array of wheels, brake rods, motors, air compressors, etc., is quite out of harmony with the streamline designs and complete inclosures of the modern automobiles and buses which crowd the cars on every highway. Along with steps to make electric railway equipment more comfortable and less noisy, the elimination of this objectionable appearance of cars is being given careful consideration on a maintenance basis.

A simple method of accomplishing this purpose even on old cars is the apron in use by the Grand Rapids Railway, as illustrated herewith. William Goldner, master mechanic, reports that the original aprons were put on solid all the way around, which was not satisfactory due to the fact that it was almost impossible to get to the trucks for oiling, repair work, etc., without removing the apron, a defect which

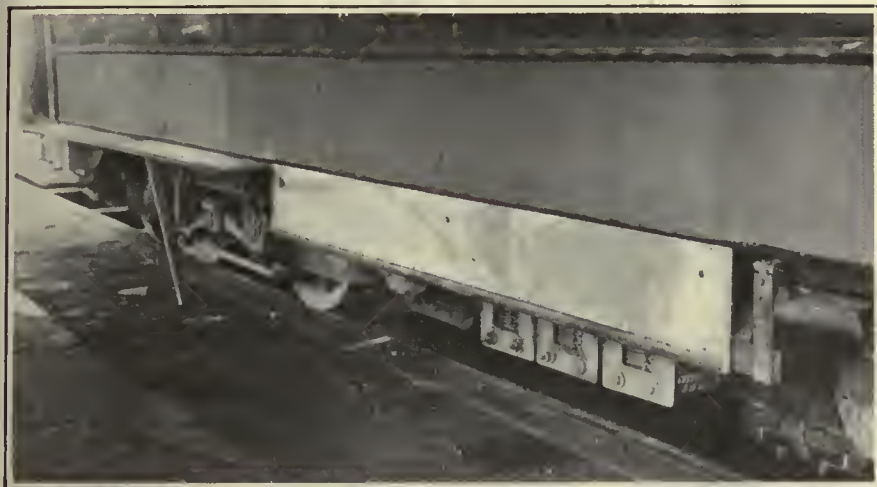


Clamp Used to Hold Fare Box in Position for Drilling and Riveting



Jigs and Fixtures for Repairing Fare Boxes

At left, jig for drilling supporting side plates; in foreground, side plate before being drilled. At right, reinforcing plate; in background, fixture for riveting.



Metal Moldings at Top and Bottom of Hinged Aprons Give Finished Appearance and Add Streamline Effect

he expects to remedy by putting the apron on hinges, as shown, which is the first apron built in that manner. This apron is $\frac{3}{4}$ -in. Plymetl, faced with steel on both sides. This provides great resistance to breakage or puncture with minimum weight. It is easily made and simple to maintain. Mr. Goldner says in the future he would prefer and specify $\frac{1}{2}$ -in. Plymetl.

The apron shown is also the first one made with the metal molding running along the bottom. The top molding is screwed to the car proper so that when the apron is hanging down in place it has the appearance of having the molding all the way around, whereas the molding is fastened only to the bottom portion of the apron, while the top edge of the apron will be perfected by one metal face being broken over the edge.

Five-Ton Winch Truck Clears Freight Wreck

BY PIERRE V. C. SEE

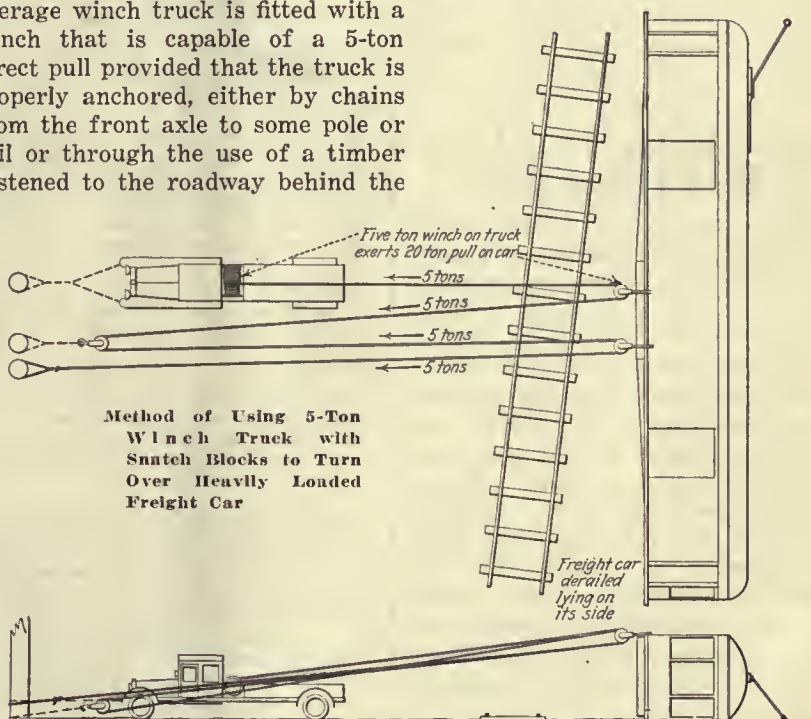
Superintendent of Equipment Northern Ohio Traction & Light Company, Akron, Ohio

MOST city properties realize the possibilities of using trucks for street car wrecking. Their ability to get to the point of trouble in a minimum of time provides a speedy method for rereiling cars and clearing minor wrecks. It seems, however, that few properties realize the great possibilities offered to use the winch-type truck and a snatch-block combination for clearing up large interurban and freight car wrecks. The track and line departments of most electric railway properties are provided with winch trucks, which are available in case of emergency. Where the railway itself is not provided with such trucks it can

usually secure the use of them from large auto towing concerns. The average winch truck is fitted with a winch that is capable of a 5-ton direct pull provided that the truck is properly anchored, either by chains from the front axle to some pole or rail or through the use of a timber fastened to the roadway behind the

truck. A 5-ton direct pull will haul the car or truck back to the track and rereail it, and if the car is in a ditch or turned over the power furnished can be multiplied by attaching additional lines with snatch blocks. Each line adds an additional 5-ton pull.

The accompanying sketch shows how a 5-ton truck was used to turn over a 43-ft., 40-ton freight trailer which was laying flat on its side. In this particular case it was impossible to get a line under the car so as to provide a rolling hitch. Had this been possible the matter of turning the car over would have been simplified somewhat. As it was, the line was connected to the highest point on the bottom of the underframe. This was at the end of the bolster



Type of Truck Used for Wrecking Repairs by the Northern Ohio Traction & Light Company

and top of the needle beam. By using four lines as shown in the sketch, it was a very simple matter to turn this heavily-loaded freight car over to an upright position with one pull.

The winch truck that was used on this job is shown in another illustration. It has a six-cylinder chassis with 36x6 pneumatic tires, duals in the rear. A large cab is provided so that seven men can be seated very comfortably inside, while the open body is used for carrying jacks, blocks and other wrecking material. This particular truck is capable of making a speed of 40 m.p.h. and makes nearly as good time as can be made with a touring car in getting to a wreck promptly. In the particular case mentioned the wreck was more than 40 miles from the shop, so this speed was of decided advantage in clearing the tracks promptly.

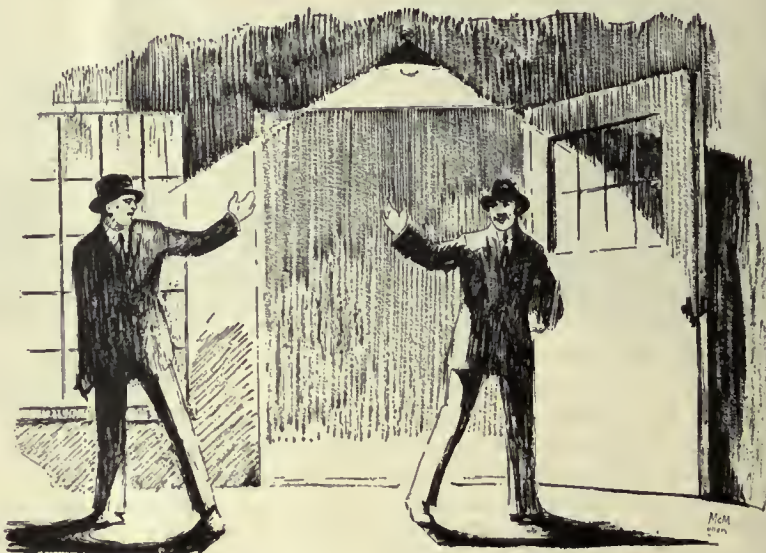
Bolted Anchor Plate Used to Hold Trolley Wire

UNTIL recently the Union Street Railway, New Bedford, Mass., experienced some difficulty with the type of anchor plate used to hold trolley wire. It had been the practice to solder the usual eyebolt clamp to the trolley wire and then attach the anchor wire to the clamp. It was found, however, that the heat from soldering had made a weak place in the trolley wire. It was also noted that the soldered surface of the clamp was so small that the trolley wire bent very easily when any extra pressure was brought to bear on the anchor wire. These defects frequently caused a breaking of the trolley wire.

To overcome these difficulties, Peter Dupuis, line foreman, designed a type of anchor plate that has proved very satisfactory. A piece of $\frac{3}{8}$ -in. machine steel plate, 8 in. long and 5 in. wide, was bent V-shaped. This plate was held together at the top by three $1\frac{1}{2}$ -in. x $\frac{3}{4}$ -in. machine bolts. Below these bolts is an 8-in. piece of $\frac{1}{2}$ -in. square machine steel, through which four $1\frac{1}{2}$ -in. x $\frac{5}{8}$ -in. setscrews are passed. The bottoms of these setscrews bear on an 8-in. piece of $\frac{5}{8}$ -in. square machine steel. When the anchor plate is in use this piece of steel rests on the trolley wire. By tightening the setscrews the $\frac{5}{8}$ -in. steel rod presses the trolley wire against the bottom of the V-shaped plate, while the $\frac{1}{2}$ -in. steel

Dick Encounters Difficulties

And Discusses Maintenance Cost Records



IT WAS far into the night when Dick Prescott, engineer of equipment of the Consolidated Railway & Light Company, and Steve White, carpenter foreman, decided to call it a day and go home. They had struggled long and wearily in the endeavor to arrive at a method of estimating the excessive maintenance cost on some of the antiquated equipment operated on their property.

"There are so many factors involved in this darn thing," said Dick, when they finally began to pack up their papers, that it's almost a guess to try to get any comparison from the meager records that we've got available."

Dick picked up the pad on which they had been working. "It would be simple if the accounts were divided for different groups of cars," he remarked as he cast his eye down the row of items they had listed. "In addition to the costs," he continued, "I would also like to see pull-ins classified by car types. Gee! I'll bet that would tell a story that would soon show our practice up in a new light."

"I can remember one case," said Steve, "where we got to looking into the number of rewinds on one particular type of armature, and everybody was surprised to learn that the darn things were being rewound more than an average of once every year. No one knew how long that had been going on, until we happened to stumble onto it. If the accounts had been set up in the right way, the cost of maintenance on that type of motor would have stood out like a sore thumb."

"Well, all this is fine for the future, but we haven't got very far in estimating the costs for some of the equipment we now have in service."

"We can't get very far with that," replied Steve. "I've been digging up all the figures I can get hold of, but they don't give much. I do think, though, that I can get some estimates together now for the old 200 series cars that we're overhauling and the new 1200s."

"How are you going to get at it?" queried Dick.

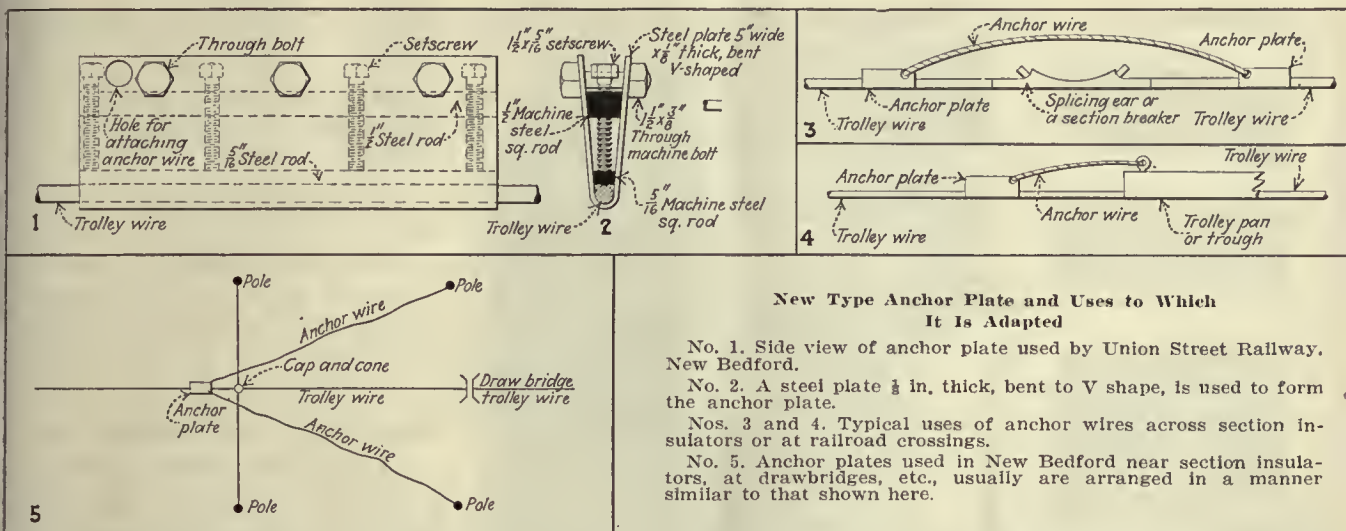
"Well, I know about what we're spending on the bodies. I can get a fair estimate of the truck job from Bill Johnson, the truck shop foreman. Then, you see, Mike over at Center barn has all the 200s and some of the 1200s. I think he keeps some records of his own that may help us out. We've got power meters on both these groups of cars, and it won't be much of a trick to find out how much the power saving on the new cars amounts to. I also think Mike can check up his pull-ins and tell us how they compare on the old and the new cars. That's about as far as we can go."

"Even if that's all we can get together, I think it's worth talking over with the old man. He's working on the budget for next year and he could use that estimate for putting in a recommendation that we buy a group of new cars to replace the 200s and stop this heavy rebuilding program on them. Gee, I'll bet the money we're spending right there would more than pay the interest on new cars."

"Yes, but what about the capital?"

"You've got energy saving, faster schedules and reduced pull-ins to figure on. That's without allowing anything for the increased riding that would be bound to result if we took those old gunboats off the street. There's no question in my mind but that we've been blindly hanging on to some of this old stuff long past the time when it was profitable to do so. Of course, it's not up to us to say what's to be done, but it's a good thing to give the old man the dope. I'll bet if he takes that kind of a proposition into the staff meeting the transportation department and the new commercial department will be ready to hug him."

"Well, all right, Dick, I'm going to beat it for home before my wife comes after me. It's going to be kind of interesting to see what the old man has to say."



New Type Anchor Plate and Uses to Which It Is Adapted

No. 1. Side view of anchor plate used by Union Street Railway, New Bedford.

No. 2. A steel plate $\frac{3}{8}$ in. thick, bent to V shape, is used to form the anchor plate.

Nos. 3 and 4. Typical uses of anchor wires across section insulators or at railroad crossings.

No. 5. Anchor plates used in New Bedford near section insulators, at drawbridges, etc., usually are arranged in a manner similar to that shown here.

rod presses against the three through bolts at the top of the plate. By this means the plate is securely held in place on the trolley wire. As will be noted, the trolley wire is not damaged by soldering and remains intact when the anchor plate is removed. This has proved advantageous when it is found necessary to change the location of the anchor plate.

Various uses have been made of these anchor plates. They are used to hold an anchor wire where section breakers or splicing ears are located and wherever any strain on the trolley wire must be relieved. Trolley wires that go into trolley troughs or dead-end at drawbridges are an example of these uses. These anchor plates are also used in locations where there is a long stretch of unanchored trolley wire, to prevent strain on the span wires. Not only have these anchor plates proved inexpensive to make but they have given satisfactory results in the several hundred places where they have been in use.

Double Sectionalizing Switch for Oil Sidings

By L. H. APPEL

Assistant Superintendent of Power Pacific Electric Railway, Los Angeles, Cal.

TO SAFEGUARD the loading and unloading of petroleum products the standard practice of the Pacific Electric Railway is to install a combined trolley and track sectionalizing switch on all spur tracks serving industries which handle oils and gasoline. This provision, together with that of installing insulated flange unions in pipe lines, has proved very effective in preventing electric sparks, which under certain

conditions may cause serious troubles in the presence of fuel oil, distillates of gasoline, etc.

The double sectionalizing switch de-energizes both the trolley wire and the track at the siding, thereby removing any potential hazard that might exist if the trolley were left energized while tank cars were being handled. A double-pole, single-throw switch is used, which consists essentially of two copper blades fastened to insulators which are installed on cross-arms attached to the pole. One blade is used for controlling the trolley circuit and the other for the track circuit. A standard maple sectionalizing insulator is inserted in the trolley wire and white fiber insulated joints in the track.



Combined Trolley Wire and Track Sectionalizing Switch in Open Position

The trolley switch blade when closed permits the circuit to be completed or shunted around the circuit breaker and similarly the track switch blade permits the circuit to be shunted around the insulated joints, thereby allowing normal operation of the spur. Both blades of the switch are operated simultaneously by means of a long pole permanently fastened to the insulated blade head. This can be padlocked in either the open or closed position by train crews.

The switch is kept open normally so that the trolley and track are de-energized and is closed only when the spur is actually in use for electric operation. In addition to the use of this equipment for sidings serving plants where oils are handled, which include approximately 75 installations, a number of single insulating switches have been installed on sidings which serve industries operating clamshell shovels or other loading and unloading equipment which might come in contact with the trolley wire. The single switch installations provide for an insulator in the trolley wire only, as it is not necessary to insulate or de-energize the track.

Labeling Parts in Storeroom Shelves

DUE to the miscellaneous character of maintenance parts stored in the storeroom of the Southern Pacific Company at its Beaverton, Ore., shops, a flexible method for installing labels is required. An entirely satisfactory method has been devised through the use of a long metal slide 2 in. wide which runs the entire length of the storeroom shelves. These slides per-



Metal Sildes for Inserting Labels Are Used in the Storeroom of the Southern Pacific at Beaverton, Ore.

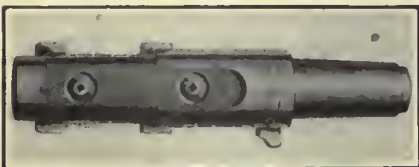
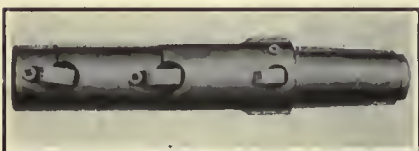
mit labels for the adjacent parts to be inserted where required, and after insertion they are protected with celluloid covers. This keeps them clean and gives a neat appearance.

Space required on the shelves for the storage of parts can be more economically used with this construction as the parts can be placed so as to make the best arrangement without regard to the location of labels.

New Equipment Available

Car Wheel Boring Tool with Wide Range Expansion

DESIGNED for the heavy-duty service of boring electric railway car wheels, a boring tool has recently been placed on the market by



Heavy-Duty Car Wheel Boring Tool

the Liberty Machine Works, St. Louis, Mo. The new boring tool has a triple arrangement of cutters, each set boring independently of the other. One set is for the rough-boring operation and a second for the finishing. The arrangement is such that the finishing cutters engage immediately after the rough-

ing cutters clear the work. After the finishing cut is taken a third pair at the top of the tool chamfers the hub.

Each pair of cutters is uniformly expanded to the desired size by means of a cam arrangement controlled by a micrometer dial graduated in thousandths. This insures close adjustment to the desired size. One of the features of the tool is the hardened cutter support, the purpose of which is to insure a rigid holder for the cutters and to prolong the life of the tool by preventing disintegration on the surfaces where the tips come in contact with the tool body.

These hardened cutter supports permit setting the roughing cutters to the correct rake and angle. The cutter is set at this rake instead of grinding away part of the surface, as is the general custom. By inclining the roughing cutters, their life is materially increased, the tendency to heat is decreased and faster speeds are permitted.

The new car wheel boring tool has a wide range of cutter expansion the purpose of which is to reduce cutter

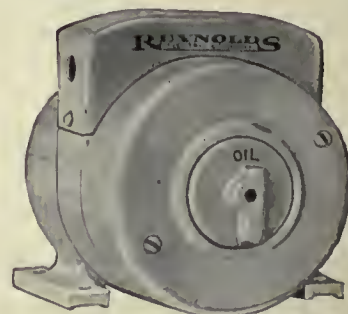
costs by using more of the high-speed steel on each set of cutters. The cutter locking device consists of a special screw lock which locks both cutters metal to metal. This arrangement insures uniformity of sizes and gives rigidity.

The tool is furnished in ten different sizes for boring steel, chilled or cast-iron car wheels. Sizes for the former range from 3½ in. to 4½ in. to 6½ to 9½ in. and for the latter from 3 in. to 4½ in. to 5½ in. to 7½ in.

Motor-Driven Flasher Unit for Warning Signals

RUGGED construction and small size are outstanding characteristics of a new unit flasher just brought out by the Reynolds Electric Company, Chicago, Ill. This flasher is for use with warning signals, crossing lights, blinkers, traffic guides, etc., as used by electric railways. The flasher mechanism is driven through a train of gears from a standard motor and all the mechanism is built into the special motor frame, so that the flasher is self-contained. The flasher is furnished with either one, two or three brushes, so as to handle a like number of circuits. The brushes ride the contactor drum without movement or vibration and special precautions have been taken which provide long life. The contactor drum operates on a quick make and break principle which is new in flasher construction and gives increased life and reduces failures.

The capacity of the unit is from 400 to 800 watts per circuit. The



New Self-Contained Unit Flasher

mechanism can be installed either inside or outdoors and its small size permits of mounting on a shelf against a wall if desired. The units are finished with two speeds, 60 r.p.m. and 7 r.p.m., so as to give respectively speed for flashing circuits on and off 60 times per minute or seven times per minute.

Association News & Discussions

Bus Maintenance and Lacquer Painting Discussed by C.E.R.A. Master Mechanics

Annual Meeting of Central Electric Railway Master Mechanics' Association at Akron, Ohio, Was Attended by Fifty Men from Central District—Topics of Interest to Interurbans Discussed

LIVE topics of particular interest to master mechanics brought out 50 men for the annual meeting of the Central Electric Railway Master Mechanics Association held at Akron, Ohio, on Feb. 11. The business session began at 9 o'clock and with an adjournment of one hour for lunch continued up to 2:30 p.m., after which an inspection trip was made through the shops of the Northern Ohio Traction & Light Company, where demonstrations were witnessed of equipment and methods used in maintaining buses and a demonstration of lacquer painting of electric cars.

Of the various committee reports, that on uniform charges to interchange of equipment brought out considerable discussion. F. J. Foote, chairman of the committee, presented the report, together with a revised list of prices for air-brake equipment. The report, including the revised prices, was adopted.

A committee was appointed to arbitrate disputes as to the responsibility for payment of parts replaced in interchange freight service. C. W. Squier, secretary of the equipment committee of the American Electric Railway Engineering Association, presented a request for consideration by the Master Mechanics' Association of two specifications now in the Engineering Manual. These specifications were E 100-12 for automatic couplers for interurban cars and radial draft rigging, including M.C.B. specifications for couplers, and E 101-12 specifications for the location of the end connections on interurban cars used in exchange service. No revisions to these

specifications have been made since 1912, and as both refer to interurban equipment it was thought that the Central Electric Railway Association men were in best position to recommend changes in revision. The matter was referred to the standards committee of the association for study and report at the May meeting.

D. A. Scanlon, general superintendent of the railway department of the Northern Ohio Traction & Light Company, referred to a request which he had received from the Cleveland Railways to provide lights on freight trailers which operate through the streets of Cleveland. It appears that several accidents have occurred from automobiles running into cars which were without light. A committee was appointed to study the subject of providing a satisfactory method of illuminating the freight trailers so that such accidents will be prevented and so that a uniform method can be used by all roads of the district. This committee is to report at the May meeting of the association. Mr. Scanlon also brought up the subject of providing containers for way bills in interurban freight cars. After some discussion of this subject, it was referred back as being out of the field of activities of the Master Mechanics' Association. Discussion of the subject of loading cars beyond the stenciled weight brought out the fact that sometimes cars were loaded far beyond what they are supposed to carry. More attention will be given to this subject, as the tariff is supposed to be based on the stenciled weight with 10 per cent overload allowed.

Several changes were suggested in truck construction for the standard freight trailer which was adopted by the association. These changes were presented by a representative of the American Car & Foundry Company, and included some points which will reduce cost of construction and also provide increased life to trucks. The changes were approved and drawings will be changed to correspond.

The new officers of the association elected are: P. V. C. See, superintendent of equipment Northern Ohio Traction & Light Company, president; E. B. Gunn, master mechanic Western Ohio Railway, vice-president; together with an executive committee consisting of Fred Heckler, superintendent of motive power Lake Shore Electric Railway; F. J. Foote, superintendent of motive power and equipment Indiana, Columbus & Eastern Traction Company; J. W. Osborne, superintendent of equipment Terre Haute, Indianapolis & Eastern Traction Company, and A. W. Redderson, superintendent of motive power Indiana Service Corporation. A resolution commending the work of the retiring president, T. H. Nicholl, superintendent of motive power Union Traction Company of Indiana, was presented and adopted. He was also appointed as new chairman of the standards committee in place of C. M. Bange, resigned.

Two papers were presented, abstracts of which appear elsewhere in this issue. The first was a discussion of the lacquer system of painting, presented by J. S. Spratt of the Valentine Paint Company. In the discussion following presentation of this paper, questions by the master mechanics brought out information that the manufacturers do not recommend the applying of lacquer paint on top of old painting, as the old surfaces vary greatly and consequently varying results are obtained, many of which are unsatisfactory. Where paint is entirely removed the lacquer does not penetrate the wood, therefore some appropriate filler must



Master Mechanics of Central Electric Railway Association in Attendance at Akron Meeting

be used. Mr. Spratt said that the fourteen hours time given for finishing an average car requires a room temperature of at least 65 deg. No special spray gun is needed for the application of lacquer paint, and there are no special requirements by the fire underwriters over what is required for varnish removers. The powder that settles from the use of lacquer painting systems is not an explosive. Where spots are slow in drying this is evidence that the surface to which the lacquer paint is applied has not been thoroughly cleaned. After the lacquer paint has been applied cleaning with a dry cloth or with water is recommended. Car cleaning preparations can be used with success, provided they do not contain an excessive amount of alcohol. There are some lacquers that can be applied with a brush, but the spraying method is more satisfactory and more economical. The brush lacquers are improving rapidly and there are some over which varnish can be used, but the large majority cannot have varnish applied with success. There was considerable discussion as to economies that could be expected from the use of lacquer painting. The principal one of these results from the rapid drying of the lacquer paint so that cars are not out of service for extended periods. The general opinion of the master mechanics present was that there is no particular saving in time of application over that which would be obtained by spraying paint or enamel. Lettering can be done successfully with either lacquer paint, oil type paints, or enamel. P. V. C. See said that he had nine different kinds of lacquer paint in use. These were all applied over old paint surfaces. None has been in use a sufficient length of time to show definite results for comparisons.

A very complete paper on bus maintenance and gas engine operation was presented by E. Wooton, superintendent of equipment Chicago Motor Coach Company, an abstract of which is published elsewhere. Questions to Mr. Wooton brought out information that he renews oil every 2,500 miles and that he does not attempt to reclaim oil. The amount of extra equipment required for maintenance and overhauling is about 2 per cent for wrecks, overhauling, cripples, etc., and an additional 2 per cent for inspection. Probably a total of 5 per cent would be a good average figure to use. During the winter season in Chicago, radiator covers are used, but no alcohol is placed in the radiators. Skid chains are not used. The cost of maintenance by the Chicago Motor Coach Company during the past year was approximately 5½ cents per coach-mile. Mr. Wooton said that his company hoped to reduce this to 5 cents during the coming year. Depreciation of buses now used in Chicago is figured on a ten-year basis. Of course, this would vary considerably in different localities. The company has a very complete record system, so that it can tell when maintenance costs amount to more than the interest would be on the investment for a new coach. This accurately determines the point at which it is economical to scrap old equipment. Present equipment used in Chicago does not

have starters, but Mr. Wooton said that larger equipment of six-cylinder engines would need starters. The scheduled speed is 10 m.p.h. in Chicago. This is figured by taking the mileage operated by the buses and dividing by the payroll time.

D. P. Cartwright of the North East Electric Company, Rochester, N. Y., presented two reels of motion pictures showing the electric starting, generating and ignition systems of buses.

The business sessions of the Master Mechanics' Association were held in the Terminal Building of the Northern Ohio Traction & Light Company, and this company also furnished a very attractive luncheon at the Portage Hotel, which was attended by the master mechanics and their friends. After the business session was com-

pleted, buses conveyed the party through the downtown garage of the company and out to the Kenmore Shops, where demonstrations were given regarding methods used in maintaining buses and also a very complete demonstration of the lacquer painting system. This latter demonstration was given by representatives of the Valentine Paint Company and included the application of all the various coats to an electric car. The car had been previously prepared with sections partly finished, so that the application could be demonstrated in a short time. This demonstration was with the application over old paint, and also included work necessary for patching. The next meeting of the association was arranged to be held in Decatur, Ill., some time in May.

Lacquer Painting Reduces Time Needed for Drying*

BY J. S. SPRATT
Valentine Paint Company

PAINING by the nitrocellulose system involves three principal materials, primer, surfacer and enamel—each a nitrocellulose product, engineered to perform correctly its special function and capable of combining the completed system into a perfect whole.

Nitrocellulose primer is a true nitrocellulose material and forms the foundation of the nitrocellulose system. It is a nearly clear material carrying only sufficient finely ground red oxide of iron to enable the operator to see whether or not he has applied an even coat over the entire surface and it possesses adhesive qualities equal to the best varnish or oil type primers. It is furnished ready for application and is applied with a spray gun in a thin, even coat. It is suitable for use on metal of all kinds or wood surfaces. However, on new wood it is necessary first to apply a coat of oil type primer or wood filler such as standard paste wood fillers. This is necessary because lacquers do not penetrate wood, forming only a protective film on the surface, and to prevent moisture creeping into the wood through some break in the film which would cause the nitrocellulose material to peel it is necessary to use a penetrating material of this type.

Nitrocellulose gun glaze or surfacer is the material that might be termed "the keystone of the arch of the complete nitrocellulose system." It clings perfectly to the nitrocellulose primer and forms a perfect surface on which to apply the nitrocellulose enamel. It takes the place of the usual lead, half and half glaze, surfacer or rough stuff and sealer coats, thereby greatly simplifying the system as well as increasing its durability. Nitrocellulose gun glaze or surfacer possesses remarkable filling properties and goes on very smoothly. For use on cars it can be applied to give a sufficiently smooth surface without sanding. However, on

buses, or where a perfect surface is demanded, it may be sanded readily to extremely smooth surface. Gun glaze or surfacer may be double or triple coated at one operation, applying more material where surface conditions call for a heavier coat, or it may be applied one coat at a time as desired. It air dries in a few hours at ordinary room temperature, ready for water sanding. Where the surface is not to be sanded, nitrocellulose enamel may be applied within an hour after the application of the last coat of gun glaze or surfacer.

The third and final material of the nitrocellulose system is nitrocellulose enamel. It is applied by the usual spray methods and it will be found that it sprays on very smooth and with quite a sheen. It can be supplied in any color. All nitrocellulose materials are supplied by the different manufacturers in heavy liquid form and should be thinned with solvent to the proper consistency before spraying. This is done for the purpose of avoiding settling, and for this reason the primer is supplied ready to apply as it contains only sufficient pigment for a guide coat.

There are as many kinds of lacquer furnished by various manufacturers as there were kinds of varnish and paint material furnished in the old days, and you will secure as widely varied results as you would from the range of varnish materials.

In the use of nitrocellulose materials I would recommend that you secure the materials for the complete system from one manufacturer, so that they are properly engineered, one material with another, as I believe that this is the only way in which you can secure uniform results.

Standard practice for a complete nitrocellulose system is one coat of primer, two or three coats of gun glaze or surfacer and two or three coats of nitrocellulose enamel. On street cars this entire system can be applied in one day. You can secure nitrocellulose materials which are elastic enough so that if you desire they may be var-

*Abstract of paper presented before the C.E.R.A. Master Mechanics Association, Akron, Ohio, Feb. 11, 1926.

nished over. These materials may also be polished to a very high luster if desired.

Without polishing a complete nitrocellulose system can be sprayed on a 45-ft. street car in approximately fourteen hours. If it is desired to sand the surfacer or gun glaze this increases the total time to an average of twenty hours.

Nitrocellulose materials are non-porous and therefore very easily cleaned, as dirt settling on them does not grind in as it does on varnish and oil enamels. The material becomes extremely hard and each time it is cleaned acquires more luster, so that for a period of time the car is getting brighter, while with the varnish type system it is steadily perishing.

Bus Maintenance an Important Part of the Chicago Operation*

BY E. WOOTON

Superintendent of Equipment Chicago Motor Coach Company

NO TWO bus properties can be operated exactly on the same principle, nor can the equipment be maintained in the same manner. I think, however, that the operation and maintenance methods practiced in Chicago can be used as a basis. We operate approximately 420 coaches, which are housed in four different garages, besides the central repair shops where all major repairs and painting are carried out. Garage superintendents are held responsible for the mechanical condition of the equipment in their respective divisions. They report direct to the superintendent of equipment, so that each division is on a competitive basis. Each division superintendent has a clerk who takes care of the clerical work, which consists principally of ready reference records of the equipment, gasoline and oil consumption and individual coach mileages. All reports are sent direct to the chief equipment clerk, who examines and files them in proper order, and at the end of the month makes up various kinds of comparative statements.

All coaches are held in for inspection on a 2,500-mile basis and a garage operating 100 coaches will run approximately 10,000 miles a day, which would represent four inspections per day. Two of these inspections would be held during the morning rush, the other 98 coaches would be scheduled for service. All inspections are completed and coaches scheduled for the afternoon rush.

During these inspections units are examined on a regular routine system, and should any of them be found defective or not considered capable of running until the next inspection the unit is removed and replaced with an overhauled one, the defective unit being returned to the central shops for repairs. The mechanics making the inspection have a complete report of the performance of the coach since its last inspection, therefore if any unit has been giving considerable trouble, this report helps the mechanic to form his conclusions. A complete record of all units is kept at the central repair shops, unit change slips being sent through for all units removed from coaches.

Each garage has an auxiliary stock-room which is supplied daily from the central stores. All parts are carried on a maximum and minimum basis, but not in large quantities. For small

parts, the minimum number to be carried is placed in a small canvas bag, so that the storekeeper knows, if he has to take the parts from the bag, that he is down to the minimum and should order replacements immediately. For large parts, the minimum number of pieces is tagged.

The inspection system, like that of all other railway equipment, is very important. It enables us to make up an estimated personnel based on an estimated mileage supplied by the transportation department, which gives a predetermined payroll. It assures that every man employed has something definite to do. He is occupied at all times carrying out work which avoids trouble, rather than waiting for trouble to develop in order to remedy it.

We find in most cases where failures occur that on analyzing the cause it was due to some apparently unimportant part failing first. We know that there are certain parts which deteriorate or wear. We will take, for example, the case of a radiator hose. During inspection the man who is accustomed to doing this work can tell very easily whether this connection is capable of running another 2,500 miles. If he is in doubt he will take it off and replace it with a new one, which will probably cost between 40 and 50 cents. If the old one is allowed to run along and give out on the road it would probably mean a ruined engine, and there are many like examples which apply.

Another feature of inspection is that it insures that all parts, such as universals, wheel bearings, etc., are lubricated at regular and proper intervals, which is very important. Do not neglect inspection of a vehicle which happens to be running perfectly to relieve something else which might be tied up, as this will finally spell disaster.

When a coach is held for inspection its oil and gas averages are referred to, as these are a good indication of the mechanical condition of the vehicle. Each division keeps on file a daily record of the gas and oil consumption of every coach, also the miles per gallon. Fuel and lubrication costs are among the highest items and should be watched constantly, coaches with low averages being given special attention.

When considering garage construction, we figure to allow 350 sq.ft. per coach and to build one inspection pit for every 20 coaches. We are very much in favor, where possible, of using the indirect heating system, which has the advantage of supplying a certain amount of circulation, also supplying the heat underneath the engines, where it is most beneficial in extreme cold weather, and can also be used for ventilating in the summer.

The central repair shops in Chicago are entirely self-contained and are connected directly with the purchasing department and the general stores, which is a great convenience, where such arrangements can be carried out. In these shops we maintain all the units, such as engines, clutches, transmissions, rear axles, etc. Schedules are arranged to bring all coaches through the shop once a year, the major work being replacement of panels, painting, etc.. Very little mechanical work is done, since our inspection system at the garages takes care of this work. We feel this is very much more economical than the old system of dismantling the chassis completely once a year, since there are no two units which have the same length of life. By using our present system we obtain the maximum mileage out of each unit before it is repaired.

We employ approximately 100 men at the central shops, which is about one man for each four coaches owned. In figuring space for the central repair shops we feel that about 100 sq.ft. for each coach owned is sufficient.

Through the courtesy of the North East Company, I have been able to obtain the services of D. P. Cartwright, with two of the company's films which

COMING MEETINGS

OF

Electric Railway and Allied Associations

Feb. 24-26—Electric Railway Association of Equipment Men, Southern Properties, Mobile, Ala.

Feb. 25—New England Street Railway Club, Copley Plaza Hotel, Boston, Mass.

March 5—Metropolitan Section, A.E.R.A., 29 West 39th Street, New York, N. Y.

March 8-11—National Railway Appliance Association, annual exhibition, Coliseum and Annex, Chicago, Ill.

March 9-11—Oklahoma Utilities Association, annual convention, Mayo Hotel, Tulsa, Okla.

March 12—Pennsylvania Street Railway Association, annual meeting, William Penn Hotel, Pittsburgh, Pa.

March 17-18—Illinois Electric Railways Association, Illinois State Electric Association and Illinois Gas Association, annual joint convention, Springfield, Ill.

March 23-25—National Conference on Street and Highway Safety, Washington, D. C.

April 13-16—Southwestern Public Service Association, Galveston, Tex.

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

Oct. 4-8—American Electric Railway Association, annual convention, location not yet determined.

*Abstract of paper presented before the C.E.R.A. Master Mechanics Association, Akron, Ohio, Feb. 11, 1926.

give some of the elementary principles of the functioning of the gasoline engine and its electrical equipment. These explain several important points.

We have three different classes of motor coach operation, city service, interurban service and long-distance service, each of which is in a class by itself. Since my experience has mostly been in city service, I would strongly

recommend that the equipment be constructed with independent units, such as engine, transmission, rear axle, etc., and that these units be built in such a manner that they can be removed quite readily without any undue mechanical work. This is of vital importance in order to keep down the maintenance cost and keep the coaches in revenue service.

sign submitted had sliding doors and stationary steps, but the cars can be equipped with the folding doors and steps without radical changes in the design. Cross seats are provided, with longitudinal seats at the end seating two passengers each.

The interurban cars with four 25 hp. motors and platform control for single unit operation should have a weight not to exceed 30,000 lb. The maximum weight with 35 hp. motors and double end train control should not exceed 37,000 lb.

The committee has also given careful consideration to other types of city cars. It found that the trend of car purchases as shown by the statistical numbers of *ELECTRIC RAILWAY JOURNAL* show that the single truck car is being bought in decreasing quantities, and that the double truck, one-man, two-man car has become increasingly popular. The committee found that as far as the single truck car is concerned, practically every car builder is prepared to build the standard Birney car or a modified Birney car and they consider that little would be gained by attempting recommendations for a new type of single truck car.

Cars with both center and end doors were discussed by the committee, which brought out the fact that such cars are used on relatively few properties and most of these are large ones. It was also found that in each instance this type of car was designed particularly to meet certain local conditions and that there was practically no uniformity in design adopted by the different properties using them. The decision of the committee was that no single design of center and end door cars could be produced which would meet the requirements of the different properties desiring to use such a car. It was therefore agreed that the committee would not attempt to submit a design for this type of car.

Metropolitan Section Reviews Steel Industry

ATALK on the steel industry, illustrated by six reels of motion pictures, was delivered by George A. Richardson, manager of the technical division Bethlehem Steel Corporation, before the Metropolitan Section of the American Electric Railway Association. The meeting was held on Jan. 5 in the Engineering Societies Building, New York City.

Before the main speaker of the evening, R. F. Carbutt, railway engineer H. L. Doherty & Company, gave a brief report of the Central Electric Railway Association meeting held on Jan. 27 and 28 in Indianapolis. John A. Dewhurst, associate editor of *ELECTRIC RAILWAY JOURNAL*, also gave a report of the New York Electric Railway Association meeting held at the same time in the Hotel Commodore, New York. A clear note of optimism and a better understanding of the basic problems that have developed was the underlying thought of both meetings.

Despite the severe weather experienced, the membership list has constantly increased from 1,122 reported at the last meeting to 1,168 reported at the meeting of Feb. 5.

American Association News

Uniform Dimensions for Cars Proposed

CONSIDERATION of uniform dimensions for cars was given by the manufacturers' engineering committee in a three-day session at association headquarters, New York, Feb. 15-17. A joint meeting with the committee on unification of car design was held on Tuesday. Those present at the meeting were G. C. Hecker, chairman of the manufacturers' committee, together with J. A. Brooks, C. A. Burleson, and W. J. Clardy; H. H. Adams, chairman of the committee on unification of car design, with the following members: L. J. Davis, H. F. Flowers, C. Gordon, J. W. Hulme, G. L. Kippenberger, C. W. Squier and V. Willoughby. J. A. Brooks of the manufacturers' committee is also a member of this committee.

After a careful study of various car designs submitted by car manufacturers, together with a review of weight, seating capacity, fundamental dimensions and salient features of cars purchased during the last five years, the manufacturers' committee has prepared four drawings embodying dimensions and features which it considered suitable to the requirements of average size city or interurban properties throughout the country.

It was the consensus of opinion that car and electric manufacturers, by agreeing on the general sizes, weights and arrangement of the cars suggested, would be in position to offer to the industry cars of essentially uniform type suited to meet the requirements of the average city or interurban operating conditions. It was thought that such general uniformity would not limit the application of individual initiative in the further development of appearance and structural details that would place each manufacturer's stamp of individuality on his product. The urge of competition, it was felt, would bring about the improvement and development of cars considered necessary from the standpoint of competition with other forms of transportation. The fundamental problem was held to be the construction of cars that would attract patronage and reduce operating cost. Second only to this in importance, it was felt, is that greater uniformity in basic dimensions could be brought about and would result in reducing both the first cost and maintenance cost of equipment.

In discussing the advantages of a general agreement among car builders and electrical manufacturers as to the

proper sizes and weights of cars for average city conditions, emphasis was laid on the fact that such general agreement was eliminating much of the present confusion regarding the type of car best suited for service in a given city, particularly on the smaller properties.

For city service, the committee proposed a light weight double truck car arranged for four motors. Drawings of cars for double end and single end operation have been prepared, that for single end operation differing from the other only in the platform arrangement at one end. The car for double end operation is similar to that shown in the 1922 report of the committee on unification of car design with bodies having 10, 11 and 12 windows. The committee recommends arch type roof construction, tapered flush platforms, with a single folding step. The first step is 15 in. and the second 14 in. high. The height from the bottom of the sill over the roof boards is 8 ft. 10½ in., the over-all width 8 ft. 4 in., post centers 29½ in., aisle width 27 in., seat length 35 in. and wheel diameters 26 in.

These cars, with four 25-hp. motors and double end platform type control, together with all safety features, should have a maximum weight not exceeding 32,000 lb. The maximum weight with 35 hp. motors and double end train control with all safety features should not exceed 37,000 lb. In considering weight, the committee felt that in most cases these maximum weights would be materially reduced in cars as constructed.

The truck centers for the ten-window car is to be 16 ft. 6½ in.; for the 11-window car, 19 ft., and for the 12-window car, 21 ft. 5½ in. The wheelbase will vary from 4 ft. 10 in. to 5 ft. 4 in.

Drawings for light weight interurban cars for double end and single end operation similar to that for city service were also considered. These cars will be made for lengths requiring 10, 11 and 12 windows. Provision is made for a smoking compartment, the size of which can be varied by moving the partition a full window length or more. A lavatory can also be incorporated, occupying one or two windows. Other details agreed upon were a plain arch roof, straight flush platforms, with first step 15 in. and second step 14 in., height from bottom sill over roof, 8 ft. 10½ in., over-all width 8 ft. 6 in., post centers 33 in., aisle width 24 in., seat length 35 in., wheel diameter 26 in., length of platform 5 ft. 4 in. The de-

The News of the Industry

Fare Question Up

Adjournment Follows Hearing Before Commission on Application for Higher Fare in Utica

Following the introduction of several exhibits setting forth the financial condition of the New York State Railways, Utica lines, and purporting to show the deficits sustained under a 7-cent fare, the railway rested its case on Feb. 17 in its petition to the Public Service Commission for permission to charge a 10-cent cash fare with provision for the sale of ten tickets for 75 cents. An adjournment was taken to March 10 to permit the city to examine the figures presented by the company and to prepare its case in opposition to an increased fare.

COMPANY READY TO CO-OPERATE

Clarence M. Williams, corporation counsel of Utica, announced to the commission that the city had retained Dr. Milo R. Maltbie to aid in the city's case. Mr. Williams asked permission of the company to have Dr. Maltbie examine the books to check the figures, but such consent was refused on the ground that it would delay the proceedings. The company through its counsel, Warnick J. Kernan, promised to supply the city with any information it desired, and Chairman W. A. Prendergast of the commission told Mr. Williams that the commission's accountants were now examining the company's books. Chairman Prendergast said that the full results of the commission's examination would be available to the city.

The valuation claimed for the Utica lines as of Oct. 1, 1925, by the company is fixed at \$10,726,427. The company estimated that the proposed fare would yield an additional revenue per year of \$96,403. This estimate was arrived at by using the number of revenue passengers carried in 1925, amounting to 16,000,229, and deducting 5 per cent for possible loss in patronage because of the increased fare. Of the 15,200,218 passengers remaining, it was estimated that 20 per cent would pay the 10-cent fare, giving a return of \$304,004, and that 80 per cent would use the token fare, giving a return of \$912,013. This would yield a revenue of \$1,216,017.

EIGHT PER CENT NOT EARNED

The company, through exhibits prepared and sworn to by J. N. Joel, general auditor, claimed that in 1923, 1924 and 1925 it fell considerably short of earning an 8 per cent return on its investment. It alleges that it failed to earn a fair return even on the rate base fixed by the commission, which it contends was far too low, and claims that the earnings would return only about 2 per cent on the present fair

value claimed by the company. It was claimed that the earnings fell \$32,074 short of earning an 8 per cent return on the commission's rate base in 1923, \$105,203 short in 1924 and \$102,765 short in 1925.

Mr. Williams stated for the city that he would reserve any rights he might have to question jurisdiction of the commission to hear the increased fare petition. In 1922 a special term of the Supreme Court denied the city a writ of prohibition, but Mr. Williams said that he was not satisfied the decision of the special term was in accord with recent decisions of the courts on the question of jurisdiction of the commission where there are fare restrictions in the franchises of railway companies.

Baltimore Commission Approves Traffic Changes

A definite plan for the rerouting of cars of the United Railways & Electric Company, Baltimore, was adopted by the Baltimore Traffic Survey Commission at a meeting on Feb. 10. The plan approved by the commission is a combination of several lists of proposed changes. It was approved as the plan best suited for all concerned. The next step to be taken is the filing of a detailed report of the changes with the Maryland Public Service Commission. Public hearings will be held and the traffic body will be called upon to show why the changes should be made. It is said that the approval of the United Railways depends upon further action on the part of the commission. In this connection it is pointed out that if cars are ordered off one street and placed on another other traffic should be regulated to take care of the changes. The commission has still to report on vehicular and pedestrian traffic. A report covering these subjects is expected to be completed in March.

One of the most important features of the plan approved by the traffic commission is the removal of all cars from the downtown section of Lexington Street. The other features include the removal of all but one line from Charles Street, removal of one-man cars from the Halethorpe line and other reroutings.

The Baltimore Traffic Commission adopted the proposed changes after an exhaustive survey made by Kelker, De Leuw & Company, Chicago. The cost of the survey is being met by city, state and the United Railways. It was brought about as a result of suggestions that were made at the time the hearings were in progress that were held before the Public Service Commission to fix the valuation of the United's property. Mr. Miles is chairman of the commission.

Fare Plea in Binghamton

Seven-Cent Fare Continued Pending Settlement—Old Dispute On Over Franchise Restrictions

The temporary continuance of the 7-cent fare in Binghamton, N. Y., on the lines of the Binghamton Railway was recently authorized by the Public Service Commission pending a final decision as to the merits of the company's application. As a result a controversy of long standing is waging anew in which the city, the commission, the railway and the courts play prominent parts. On Jan. 30 the city filed a notice of appeal to the Court of Appeals from the decision of the Appellate Division.

The issue goes back to 1919, when the former receiver applied to the old Public Service Commission for an increase in fare from 5 to 6 cents. The city of Binghamton questioned the jurisdiction of the commission on the ground that there were restrictions in the franchises which limited the fare to 5 cents, but the commission overruled the city's objections. The city then applied to the Supreme Court of the State of New York for a writ of prohibition restraining the commission from granting a rate of fare in excess of 5 cents and restraining the receiver from charging a fare in excess of 5 cents. The writ was finally granted and entered on Dec. 17, 1919.

The receiver immediately took an appeal to the Appellate Division of the Supreme Court, but early in 1920, before the appeal could be argued, the Common Council of the city of Binghamton adopted an ordinance authorizing the receiver to collect a 6-cent fare for a period of two years. This ordinance contained a provision which precluded the receiver or the company from prosecuting its appeal while the ordinance was effective. Similar ordinances were subsequently granted covering the years 1923 and 1924.

In 1925 the Common Council of the city granted an ordinance consenting to a 7-cent fare for a period expiring Jan. 15, 1926. This ordinance contained no provision prohibiting the company from prosecuting the appeal from the order granting the writ of prohibition. The appeal came up for argument at the May, 1925, term of the Appellate Division, and a decision was rendered reversing the decision of the lower court and authorizing the prosecution of the original application to the Public Service Commission. The decision of the Appellate Division was based largely upon the ground that the restrictive provisions of the old franchises were intended to apply only to horse cars, and that when the horse car lines became electrified the 5-cent fare limitations contained in the old franchises became ineffective.

Upon the adoption by the Common

Council of the city of each of the ordinances mentioned consenting to a fare in excess of 5 cents for a stated period an order was procured from the Supreme Court holding the writ of prohibition in abeyance for the period covered by the ordinance. An application was then made to the commission for permission to charge the fare permitted by the ordinance for such period. On Jan. 15, 1926, the authorization expired which had been passed early in 1925 by the commission to charge a 7-cent fare under the ordinance.

In view of the decision of the Appellate Division holding that franchises did not limit the rate of fare which might be charged, the company filed with the commission in December, 1925, an application to continue the 7-cent fare beyond Jan. 15, 1926, without asking for any consent from the city. The commission on Jan. 15 granted its temporary order.

Ten Cents in East St. Louis

The East St. Louis Railway, acting under a federal injunction restraining the Illinois Commerce Commission from interfering, advanced the basic fare in East St. Louis, Ill., from 8 cents cash to 10 cents on single fares, effective Feb. 14. The new schedule means single cash fares of 10 cents or five tokens for 40 cents. The old scale was 8 cents for single cash fares or two tokens for 15 cents. The interstate fare between St. Louis, Mo., and East St. Louis and to points beyond East St. Louis will not be affected by the change in the East St. Louis city fares for the present.

The railway took the matter before the federal court after the Illinois Commerce Commission had twice suspended action on the company's petition for increased fares. The company contended that the failure of the state body to take some action on the petition for increased fares was in violation of the United States Constitution. The petition was passed on by Federal Judges Page, Lindley and Evans and the injunction was granted by them on Feb. 5 at Danville, Ill.

The application for increased fares in East St. Louis was first presented to the state commission almost a year ago and final testimony in the case was heard in October.

\$5,000,000 Program Awaits Cleveland Council's Action

John J. Stanley, president of the Cleveland Railway, Cleveland, Ohio, says that as soon as the amendments which have been suggested to the Taylor franchise are adopted he immediately will call for the sale of a large block of new Cleveland Railway stock to finance the first portion of the improvements.

The changes are very simple. It is intended to provide a wider range of fare limits to meet contingencies created by unusually expensive operating periods, to increase the interest fund from \$500,000 to \$1,100,000, and to set up a sinking fund for capital retirement.

The first offer will be to stockholders as usual. But if this fails to provide all the capital needed the amendments

make it possible to offer the stock on the open market with a two point discount to encourage salesmanship on the part of banks and bond houses.

First call for stock subscriptions in the improvement program may run as high as \$3,000,000, if present shareholders of the company subscribe as much as 10 per cent of their present holdings, and this probably will cover all the work that can be accomplished in 1926.

Here are some of the items in the improvement program:

Four new carhouses, one of the first

being a new plant to replace the antiquated Cedar Avenue carhouse.

Rail extensions on Pearl Road to the city limits.

Bus extensions in all outlying parts of the city and the suburbs.

Purchase of at least 100 new cars and as many additional buses.

Beginnings on various new short cuts and private rights of way to speed up service on many congested lines.

Development of multiple-unit train service on heavy main lines.

Experiments with buses and street cars in various rapid transit combinations for express and local service.

The amendments are substantially those proposed last June by the metropolitan transportation commission.

Bay Cities Agitated Over Fare Increases

Recent Increases in Rates Authorized by Commission Result in Hatching of Fantastic Bus-Ferry Scheme—Oakland Commissioner Suggests Survey of Entire East Bay Problem

SHARP attacks are being directed at the California Railroad Commission by clubs and civic organizations of the East Bay as the result of a series of recent decisions raising rates on the Key System Transit Company's lines and ferry and the Southern Pacific ferry and denying the application of a new ferry company which wished to operate between Berkeley and San Francisco.

Berkeley is taking a leading part in the fight, because that city is very much interested in getting the new ferry for autos and pedestrians. Despite the inadvisability of provoking a ferry rate war and with it lower fares, this seems actually to have been the desire of some of the protestants.

The Railroad Commission found, however, that there is no present need for the new ferry, because the public is already adequately served by two competing lines. The commission found further that the new ferry would not lower rates, because the rate schedule filed with the franchise application was higher than on those of the competing lines. This decision, coming on the heels of two denials of rate rehearings requested by Berkeley and Oakland, stirred a storm of protest.

A. O. Stewart, president of the Golden Gate Ferry Company, denied a certificate by the commission, has asked for a rehearing. In the meantime he has suggested to Mayor John L. Davies of Oakland that Oakland and the ferry company go into partnership in a bus-ferry combination, the city of Oakland to finance a bus service to the waterfront and his company to run a ferry service to San Francisco from Oakland. This plan is now being considered by various civic bodies and may be put on the ballot at the next election.

In the meantime the higher rates are in effect on the Key and Southern Pacific ferries and the Key traction system. The Key got its increases as "emergency measures," following a higher wage award to carmen by an arbitration commission. Then, after this raise had been granted, the Southern Pacific requested a separate hearing, at which it demanded higher rates to jibe with those on its rival, the Key system. New rates for the Southern Pacific were approved by the commission and went into effect on Jan. 25.

Officials of Oakland and other East Bay municipalities attended these rate hearings and presented their side of the case. Their contentions were overruled and the increases granted by the commissioners, after due deliberation. Then followed a series of rehearing petitions, all of which were denied.

The plan hatched at Oakland to vote on a municipal bus proposition at the next election has many backers, among them the Mayor and at least one city commissioner. Whether the suggestion would appeal to two-thirds of the votes is doubtful. Taxes are high in Oakland. They went up last fall. Sentiment favors their reduction. A million dollar bus bond issue, such as has been proposed, would undoubtedly raise taxes, and for this reason many would vote against it. The same thing applies to Berkeley and Alameda, which would probably be asked to aid the bond issue. Berkeley is conservative. A municipal bond issue for buses would be unlikely to receive even a majority in that city. Alameda is small and its vote would be unimportant, so far as the general result is concerned.

City Commissioner Frank Colbourn of Oakland has suggested that a survey be undertaken at once of the entire East Bay transportation problem.

Monorail Discussion Revived at Detroit

Discussion of the construction of an elevated monorail system at Detroit has been revived, and a new request of the Michigan Elevated Railway to construct an experimental system has been taken under advisement by the Detroit City Council. Representatives of the company, members of the Detroit Rapid Transit Commission and of the Department of Street Railways were present at a recent hearing at which the proponents of the elevated system stated that the company was prepared to finance the undertaking without assistance. It was also proposed to furnish an indemnity bond insuring the city against expenses and accidents.

Similar requests have been received by the City Council during the past several years and an adverse report was referred to which was made by the Rapid Transit Commission after it had studied the proposed system.

Seven Cents Sought in Elkhart

The Chicago, South Bend & Northern Indiana Railway applied to the Indiana Public Service Commission on Feb. 8 for authority to increase the cash fare on its Elkhart city lines from 5 to 7 cents and to sell tickets at the rate of four for 25 cents. The company sets forth that after the payment of its operating expenses, taxes and paving assessments for 1925 there was a deficit of \$10,466 without making allowance for any return on money invested in the local system.

The company says, indicative of the necessity for the rate increase, that since the year 1916 the taxes on its property in Elkhart have increased 141 per cent; that since that year the cost of labor has increased approximately 100 per cent, and cost of material used in the maintenance and operation had increased approximately 85 per cent, that the cost of operating and furnishing that city service had increased approximately 100 per cent, and that in 1925 the railway suffered a decrease of \$4,066 in its revenue from the street railway lines compared with its average revenues for the period from 1921 to 1925 inclusive.

R. R. Smith, vice-president and general manager, said the company was forced to face the fact that it was impossible to continue longer the 5-cent fare in Elkhart. It was hoped the cost of operation would so recede that it could feel justified in continuing the 5-cent fare, but there seemed no likelihood of any recession in prices which would make that possible. He said the increase in the use of the automobile and the bus had seriously affected the earnings of the interurban line. The company published an advertisement explaining the situation.

Increase in Pay for Detroit Shopmen

A flat increase in wage of 5 cents an hour has been granted by the Street Railway Commission in Detroit to about 325 employees of the department's Highland Park shops. The men had asked an increase of 10 cents an hour, free transportation and a week's vacation annually with pay. The requests for free transportation and vacations were denied and the 5-cent increase was granted to the employees. The new scale included those who formerly received 80 cents an hour and those who received less than that rate but had been in the employ of the department two years or more.

A few weeks ago it was announced to

the men that they would be permitted to work Saturday afternoons at the old rate of pay, but this arrangement was not satisfactory to them. They wanted an increased wage rate rather than a longer week with its increased amount. Only a few men took advantage of the opportunity at that time. The later recommendation of the general manager of the department that the men be allowed to work Saturday afternoons from Oct. 15 to April 15, if they wish, was adopted by the Street Railway Commission.

New Railway Line for Toronto's Suburbs

A joyous occasion was the opening some time ago of the Weston-Mount Dennis Street Railway under the supervision of the Toronto Transportation Commission, Toronto, Ont. Official ceremonies, followed by a parade, elaborate floats and congratulatory speech-making, marked the happy day which brought the suburbs of York, Weston and Mount Dennis nearer the realization that some day they will be part of Toronto. The only lugubrious feature of the celebration was the carrying of the corpse of the old Toronto Suburban Railway, which formerly supplied service to these townships.

One hundred and fifty vehicles were in the parade. The line of march was through Mount Dennis to the northern limits of Weston, returning to the boundary line between Weston and York Township, where the official opening was held. A conspicuous part of the parade was on old horse-drawn car labeled "In Service Before 1891." Driving this was James Scott, who has served 33 years with the railway. After the old car came three of the modern red cars of the Toronto Transportation Commission carrying officials.

George S. Henry, Provincial Minister of Public Works, was the first speaker. He said that the occasion marked the passing of another milestone by the metropolitan suburbs of the city of Toronto. The fact that the Toronto Transportation Commission had undertaken to operate the transportation facilities showed the interest the city was taking in the suburbs. P. W. Ellis, chairman of the Toronto Transportation Commission, assured the people that the time would come when they would be part of Toronto. He said: "If a private concern were to take over the transportation it would lose money. But you are a good municipality and have fine borrowing powers. The agreement is fair to both sides."

Continuation Transfers in Irvington Not Needed

Issuance of continuation tickets by the Public Service Railway, Newark, N. J., from short route cars on Springfield Avenue to through cars has been held unnecessary by the New Jersey Board of Public Utility Commissioners. The town of Irvington sought to compel the company to grant continuation transfers without charge. It alleged that a person boarding a westbound car downtown after riding through two fare zones as far as Elmwood loop and desiring to reach a point west thereof would have to alight and pay an additional 5 cents to reach his destination.

The railway said that fare zones had been laid out in accordance with a plan intended to apply to the entire district and that to issue continuation slips would establish a precedent, cause undue hardship to one-man car operations and burden the company financially. It offered in evidence traffic checks to show that between 6 a.m. and midnight on a typical day 190 passengers arrived at the loop on 123 westbound car trips, but that only 24 transferred at this point to through cars.

\$10,000,000 for Rolling Stock Suggested for Detroit

Within the next three or four years the Department of Street Railways at Detroit, Mich., should spend approximately \$10,000,000 on new equipment and repairs to present equipment. H. U. Wallace, general manager, made this statement before members of the North End Progressive Business Men's Association on Feb. 16. This sum, Mr. Wallace said, could be paid from the earnings of the system without increasing the fare. At least 150 cars are obsolete and should be replaced soon. He said:

These 150 cars outlived their usefulness long ago. They cannot be repaired and we are forced to keep them in service because we have no others to replace them. There are cars that should be scrapped or rebuilt, and others that should be repaired at once, about 750 in all.

Even the Peter Witt cars are obsolete in some respects. They lack certain safety appliances which I consider essential, and the seats and floors should be changed. The seats are too hard and uncomfortable. We have found that leather upholstered seats have twice the durability of cane upholstered seats.

As for the change in the manner of building floors, the new specifications for street cars call for battleship linoleum floors. These are easier to clean than the present wood slat floors, they add warmth to the cars, they have a better appearance, and they afford better footing for passengers in wet weather.

It would not, however, be necessary to scrap these cars. They could be rebuilt and repaired.



An Exhibit that Appeared in the Line of March at Toronto

Wage Agreement in Cedar Rapids

Negotiations over the wage scale of railway operators employed by the Cedar Rapids & Marion City Railway, Cedar Rapids, Iowa, came to an end recently when the carmen agreed to renew a trial agreement of six months ending July 1, 1926. On that date they will get an increase of 2½ cents an hour, providing the company's revenues come up to the estimates made last summer in the city audit. If the increase is granted, it will be retroactive to Jan. 1, 1926. A similar agreement was made last July, but the company opened its books to show that business had not been as expected when higher fares were granted by the city and when the men were given one raise of 2½ cents last summer. The top scale is 52½ cents an hour for the carmen.

Pension Plan Under Consideration in Portland

At the annual banquet of the "Twenty-Year Club" of the Portland Electric Power Company, Portland, Ore., it was found that twelve of those present, including President Griffith, belong to the still more exclusive group known informally as the "30-year men." The combined years of service of the 278 members aggregate 6,661 years, and more than 50 new members have been added during the past year. The first woman to be admitted is Miss Annie I. Warnock, since 1906 assistant paymaster of the company. In two instances father and son are represented in the club, each having been with the company for 25 years.

Official announcement was made at the meeting by Franklin T. Griffith, president, that a general plan for an employees' pension system was under consideration by the company.

Philadelphia Will Not Appeal Fare Decision

City Solicitor Gaffney of Philadelphia, Pa., declared on Feb. 9 that no appeal would be taken by the city in the Philadelphia Rapid Transit Company fare case, in accordance with instructions received from Mayor Kendrick.

Mr. Gaffney said the city in its attack upon increased fares had for its objective the reduction of the company's operating expenses. He said that in a printed brief it had got together testimony in support of a drive principally against the amount of \$8,560,400 set up each year since 1921 for maintenance and renewals, the 77 cents an hour wage payment and the federal income and other taxes.

The commission rejected the city's contention relative to the first two items and found in favor of the company. The reasoning of the commission in support of its findings, he said, had not shaken the conviction of the city in the soundness of its own contention. He referred to the case of the City of Scranton vs. the Public Service Commission, in which the city of Scranton appealed the decision of the commission. Mr. Gaffney quoted in part what Judge Porter said in this

case: "We are of opinion, after mature consideration, that we are without authority to set aside a finding of fact by the Public Service Commission which is supported by substantial evidence where no constitutional question is involved." Mr. Gaffney said that that case had been followed and approved in a number of later cases.

The United Business Men's Association, which was a protestant in the fare case, has decided that it would not appeal the decision of the Public Service Commission in upholding the Philadelphia Rapid Transit Company's petition for maintenance of the 7½-cent fare.

Suburban Passenger Report at New York Due Soon

Governor Smith of New York has signed the Webb bill as Chapter 2 of the laws of 1926, extending to March 15, 1926, the time in which the commission created in 1925 to investigate and report upon the suburban passenger transportation problem of the city of New York must report to the Legislature.

Waukesha-Milwaukee Franchise Approved

The public utilities committee of the Common Council of Milwaukee, Wis., recently approved the application of the Milwaukee Electric Railway & Light Company for a franchise to operate the new Waukesha-Milwaukee high-speed electric line. A dispute was in progress for some time between the company and the City Council over the legality of this new high-speed line. After the company had secured a certificate of convenience and necessity from the commission, the city said that a franchise was necessary in view of the fact that the line would block numerous streets in the city. The company argued that the new line was in reality an extension of the present Clybourn Street line, and would be entitled to operate under the franchise granted in 1910. The company has not yet signified whether it will accept the grant.

Reorganized Company in Ohio Resumes Operations

The Nelsonville-Athens Electric Railway started operations on Feb. 8 between Nelsonville and Athens, Ohio. This is the new company which grew out of the reorganization following the abandonment of the Hocking-Sunday Creek Traction Company. This line had been in receiver's hands for months and was out of operation for weeks. It was sold late last year to E. B. Young, former general manager of the company, for \$41,500. At that time the bondholders purchased the railway through Mr. Young, who said that he would resume operation of the system.

The company will operate a bus line as an auxiliary to the traction line. Buses will meet each interurban car and operate over a scheduled route in the city of Athens, Ohio, thereby giving hourly service over the principal streets of the city.

Service in Syracuse Explained

Education of the public to a realization of the company's imperative need of greater revenue by an increase in fares in Syracuse, N. Y., has been undertaken by the New York State Railways. The company has a petition before the Public Service Commission asking for a 10-cent cash fare rate and a rate of 7½ cents for ticket riders.

The advertising campaign which the company is promoting consists of a series of statements designed to arouse interest in the public utility.

One of the advertisements consisted of a condensed financial statement for the three years ended Sept. 30, 1923, 1924 and 1925. In 1923 the company had a shortage of \$404,013. In 1924 it was \$387,522, and for 1925 \$388,543. One of the advertisements says in part: "A shortage of \$1,180,079.42 in three years. How would you like to run a business that couldn't make a reasonable profit? In the face of these figures we believe that you will agree that your trolley company is giving far more than ordinary public service." In other statements the company has explained its business in detail, what the cost of public improvements meant, how much it cost to maintain service, how much of the fare goes for wages, and other pertinent questions.

Tired of Playing Tacoma Mayor's Game

The Puget Transportation Company, operating buses in Tacoma in competition with the lines of the Tacoma Railway & Power Company, at a recent meeting of its board of trustees, defied Mayor A. V. Fawcett to make good his reported threat to revoke the bus permits issued the company. The action is a step in the quarrel between the Mayor and the bus company, declared by company officials to be a political move on the Mayor's part. George Vandever, attorney for the company, charges the Mayor with a plan to purchase the Tacoma railway for the city and of using the company as a club to beat down the price of the street railway system. The trustees of the bus company state they will continue to operate the buses as long as it is possible, in the hope of salvaging something for the stockholders.

Utah Association Does Work of Mercy

The Traction and Power Mutual Aid Association, a body composed of employees of the Utah Light & Traction Company, the Utah Power & Light Company, Phoenix Utility Company and Western Colorado Power Company, held its annual meeting on Dec. 16, 1925, at Salt Lake City and elected officers for the ensuing year. The secretary's report showed that the association paid death claims of \$6,000 during the year 1925, and for sickness, accidents and service refunds the sum of \$4,656. A surplus of \$14,303 was divided among the members in the usual form of a Christmas dividend of \$15 each for twelve months membership and fractional time at the same ratio, 979 members participating in this.

Interurban Station Ordinance at Kansas City to Be Rescinded

At a meeting of the City Council of Kansas City, Mo., on Feb. 8 an ordinance was introduced into the lower house of that body with a view to repealing the franchise of the Central Interurban Station Company. The repeal ordinance was referred to the conference committee.

The original franchise, granted on Jan. 9, 1918, provided for a union interurban station at the northeast corner of Tenth and McGee Streets. The building was to have been a combined station and office building to cost \$3,000,000.

Work on the proposed structure was to have been started by the station company within one year of the granting of the franchise. Two of the interurban companies which were to have participated in the plan met later with financial difficulties and the Kansas City Railways was placed in receiver-ship. Officials of the terminal company secured two extensions of the time limit passed by the city fathers, but continued financial obstacles and the advent of many bus services, both in the city and between it and other cities in this vicinity, gradually caused the dream of the central interurban station to fade almost beyond recall.

In an interview several months ago, C. C. Peters, president of the company, admitted the improbability of the project's ultimate consummation, due to the much-altered general conditions in this section since the World War.

A part of the ground which was to have been the site of the station has been leased by the company during the last several months for a parking station, at an annual rental said to be little more than enough to pay the taxes and interest on the realty. No announcement has been made of plans for selling the property, in the event the franchise is repealed.

Rhode Island Railway Seeks Market for Surplus Power

In a bill filed with the Rhode Island Legislature authorization is asked for the incorporation of the United Electric Power Company at a nominal capitalization of \$100,000. According to the petition, the new corporation would take over the power house and transmission lines of the United Electric Railways, Providence, and provide for the power requirements of electric railways, lighting, transmission and manufacturing purposes. The incorporators are Albert E. Potter, president of the United Electric Railways; Zenas W. Bliss, George H. Newhall, Harvey A. Baker, Ralph S. Richards, Edward B. Aldrich, J. Cuncliffe Bullock and Harold J. Gross, all directors of the United Electric Railways.

Bond Legislation Likely in New York

It seems likely that the Legislature will pass at the present session an amendment to the Constitution giving to New York City an exemption from its debt limit of \$300,000,000 which may

be raised by bonds for the building and equipment of subways. The original proposition was for an exemption of \$275,000,000, but the legislative leaders are inclined to go a step further and give an additional \$25,000,000 exemption. The measure will have to be re-passed by the Legislature of 1927. It can then be submitted to the people and the money made available under its provisions for construction work in 1928.

Increase in Fare Sought in Albany

The United Traction Company, serving the cities of Albany, Troy, Water-vliet, Rensselaer and Cohoes, N. Y., has filed application with the Public Service Commission to increase its fare from 7 to 10 cents, with the sale of thirteen tickets for \$1. Hearing on the application will be announced at an early date.

Discussion of New Franchise in Richmond, Va., Renewed

Negotiations are being conducted between the City Council in Richmond, Va., and the Virginia Electric & Power Company for a blanket franchise covering all of the lines operated by that company. Some of the franchises which the company now has it considers perpetual. Others run to 1940. One expired on Jan. 1. It is the purpose of the company and the city to try to draft in conference a complete franchise satisfactory to both. One objection to some of the present franchises is that they specify the routes. Some also specify the headway. These conditions have prevented the company from improving the service as much as it otherwise might have been able to do. If the new franchise goes through, the company will probably reroute its cars down town and extend some of its rail and bus lines.

The law requires new franchises to be offered at public auction, but it does not require the city to accept the highest bid. The city is permitted to accept the bid it considers best for the city from every point of view.

News Notes

Will Rehear Fare Application.—The Pacific Electric Railway has been granted a rehearing by the Railroad Commission on its application for an increase in railway and motor coach fares in the city of Pasadena, Cal. The rehearing will be held before Commissioner Seavey in the court room of the commission at Los Angeles on March 16.

Pass System in Effect.—The Kingston, Portsmouth & Catarqui Electric Railway, Kingston, Ont., started selling the first of the year a weekly pass for 75 cents.

One Day Off Bill Reappears.—Under the provisions of a bill introduced in the New York Senate by James L. Whitley, Republican, of Rochester, in which city the traction and bus companies are operating under a service-at-

cost-plus plan, the railroad law is amended to require operators of street surface railroads, trackless trolley or omnibus lines in cities or villages to give employees one day of rest in seven.

New Paper Appears.—The Jacksonville Traction Company, Jacksonville, Fla., started recently the publication of a pamphlet called the "Palm Leaf." It is to be issued every month for the benefit and entertainment of the employees. E. Q. Brown is editor.

Change in Name Desired.—At a recent special meeting held in Cleveland the directors of the Northern Ohio Traction & Light Company, Akron, Ohio, voted to change the name of the company to the Northern Ohio Power & Light Company. The action must be ratified by stockholders and a special meeting to act on the recommendation has been called for March 15.

Wages in Spokane Increased.—J. E. Royer, assistant general manager of the Spokane United Railways, Spokane, Wash., recently announced that an increase of pay for 218 railway men had been granted by the company to date from Feb. 1. The plan of the company to increase the pay of its street railway operating force came out in the hearing of the street car fare increase at Olympia, when officials of the company testified that \$26,000 had been set aside for that purpose in the 1926 budget, or approximately \$10 per month per man on an average. Mr. Royer said that the men were entitled to share in the fare increase; that the public had accepted the increase without protest and it was well that it should know that the men are to get a share of the slight addition to the fare. The fare settlement has been referred to in these pages.

Ten Cents in Belleville Allowed.—Efforts of City Attorney L. N. Perrin of Belleville, Ill., to prevent the East St. Louis & Suburban Railway from collecting a 10-cent fare on its cars in Belleville failed on Feb. 9 when United States Judge Lindsey in Chicago overruled a motion of the city for a modification of an injunction granted to the company several years ago. The injunction restrains the Illinois Commerce Commission from interfering with the rate charged by the company. The state commission was restrained on the grounds that the restrictions placed by the commission were confiscatory and in violation of the constitutional rights of the company. On Jan. 24 the fare in Belleville was advanced from 7 cents to 10 cents over the protest of the city officials. The city had sought to reopen the injunction case on the ground that the character of the company's business had changed since the granting of the injunction due to an extension of the Belleville city limits.

Refuses Request for Terminal.—The City Commission of Trenton, N. J., has refused the request of the Public Service Railway to establish a trolley terminal at Liberty and Adeline Streets to relieve traffic conditions at State and Warren Streets, more than a mile away. The refusal of the commission was based on the likelihood that traffic would become congested at the proposed new terminal.

Recent Bus Developments

Irresponsible Bus Operators in Massachusetts Must Go

Acting under the new law of 1925, which gives it jurisdiction over buses, the Massachusetts Department of Public Utilities has prepared a tentative draft of rules and regulations which will cover all the operations of the passenger-carrying buses in the state. This draft will be submitted to the interested parties for suggestions and criticisms and a public hearing on it will be given at the State House on Feb. 24. In brief, the commission takes control over the licensing of the buses, will require the filing and publishing of rates, will prescribe definite routes for all buses and will require a timetable, just as is done in the case of railroads and electric railways.

Every owner of a bus or buses to be operated in the public ways in Massachusetts, and doing an intrastate business either in whole or in part, will be required to obtain licenses and meet the bond and other requirements of each city and town in which they operate. A permit from the Division of Highways and a certificate of public convenience from the Department of Public Utilities will also be required.

The schedules to be filed must show the regular starting time, the time for passing certain points en route and the time of arrival at the terminal, and the rules say that no schedule shall be provided or maintained which will require unsafe and unreasonable speed. The rules will hold the buses to the schedules and to the defined routes, and if a bus fails to operate for a certain length of time it automatically loses the license.

The rules prescribe dimensions and weight of the buses, the strength of the cars, what the reserve equipment shall be, the degree of maintenance, and the condition of the equipment, types of tires, diagram of gear shifts and hours of service.

The regulations go into the subjects of conduct by the operators, application of the rules and penalties.

The rules will not be put into final form until after the public hearing. They are the first rules proposed for the control of the jitney or bus business in Massachusetts.

Bus Lines in New York City by July 1

Another step in the plan for New York City-wide bus operation was mounted on Feb. 17 when an amicable agreement was reached by the sub-committee of Mayor Walker's transit conference on the bus routes. Speaking for the sub-committee, which includes members of the State Transit Commission and the Board of Transportation, Joseph V. McKee, Aldermanic President, announced his belief that franchises for bus lines in all the boroughs would be awarded by the Board of Estimate within a few weeks

so as to give the successful bidders sufficient time to acquire equipment to be placed in service on July 1, the date on which Mr. McKee believes city-wide bus operation can be effectively realized. This belief he announced at the close of a conference held in the City Hall, in which the Board of Transportation was represented by Commissioner Daniel L. Ryan and the Transit Commission by Commissioner LeRoy T. Harkness.

The routes, numbering 55 in four boroughs, will first be presented to the Mayor's transit conference and later to the Board of Estimate for official adoption. The President of the Board of Aldermen said that the routes adopted by the committee followed closely those recommended in the latest report by the Board of Transportation, of which John H. Delaney is chairman, together with the incorporation of certain of the modifying suggestions made by the Borough Presidents for routes in their respective boroughs. He intimated that while it might be found necessary to incorporate in the scheme some minor alteration, the principal features of the routes as suggested by the Board of Transportation had found favor with all in the "get-together" conferences.

With an agreement on routes assured, the question of franchises and general operating policies will be taken up. The problem, in Mr. McKee's opinion, lay in determining upon a policy of awarding borough-wide franchises for the most part or of awarding franchises for only partial borough operation to individual bidders.

Thirty-five-Mile Bus Line Proposed in New York

The Buffalo & Erie Coach Corporation, a subsidiary of the Buffalo & Erie Railway, proposes to operate buses between Jamestown and Westfield, N. Y., over a route now served in part by a line of the Chautauqua Traction Company soon to be abandoned by permission of the State Public Service Commission. The proposed line would be 35 miles long. The bus company will apply for franchises at once to the Jamestown Council, it was announced, following a conference on Feb. 8 at Jamestown of citizens, representatives of the Broadhead traction interests and of the Buffalo & Erie Railway. The corporation agrees to carry no local passengers within Jamestown and between Jamestown and Asheville or intermediate points, this territory to be served by the Jamestown Street Railway, a Broadhead Corporation, when the Chautauqua Traction Company ceases operation.

Higher Fares Allowed.—Increased fare schedules have been ordered by the Indiana Public Service Commission for the bus line operated by the Chicago, South Bend & Northern

Indiana Railway, South Bend, Ind., and a suspension of service was authorized on part of the line where losses have occurred. The new fares are based on a rate of 3 cents a mile.

Buses Suggested for Relief.—The use of buses to supplement the Municipal Railways of St. Petersburg, Fla., was recommended recently to the City Commission by R. E. Ludwig, director of public utilities. Mr. Ludwig advised the purchase of a fleet of buses to relieve street car congestion during the remaining months of the winter. Meanwhile the railway is being extended.

Competing Buses Removed.—Bus competition with the Weston-York Township-Toronto electric railway line operated by the Toronto Transportation Commission has been discontinued by official order as far as buses operating between Weston and Toronto are concerned. However, a bus line giving a service parallel to the railway from Toronto to a short distance outside the city limits continues in operation. The opening up of the Weston-York Township line has been referred to in these pages.

Buses Authorized in Fort Worth.—The City Council of Fort Worth, Tex., has adopted an ordinance by unanimous vote authorizing the Northern Texas Traction Company to operate buses in Fort Worth in connection with its railway system. No restrictions were imposed on the routing of the buses in view of the fact that their operation is an experiment.

Seeks New Bus Franchise.—The United Traction Company, Albany, N. Y., is seeking a franchise from the Albany Common Council to operate a bus line over New Scotland Avenue. An ordinance has been introduced in behalf of the company. The action of the Common Council must be confirmed by the Public Service Commission. The Albany Transit Company, an independent, is seeking a franchise to operate over the same avenue.

Supplementary Service Under Consideration.—The Birmingham Electric Company, Birmingham, Ala., is contemplating the operation of a number of modern passenger buses to supplement its railway service in several sections of the city. One of the proposed lines would run from East Lake to Huffman, replacing the Roebuck car line, while another would extend from Fairview to Bellview Heights. The matter is now being considered by the City Commission.

New Line in Burlington.—The Iowa Southern Utilities Company will start a temporary bus service in the spring following the authorization to establish a bus line in Burlington, Iowa, to supplant the present South Hill street car line. New buses, of the type now used on the Agency and Mount Pleasant-Bluff road lines are to be ordered, John H. Chase, resident manager, announced. It is said no further replacement of street car lines with buses is contemplated at this time. The company will remove its tracks and pay \$12,000 in a series of installments to the city for relieving it of the responsibility of replacing the pavement.

Financial and Corporate

Milwaukee Does Well

\$513,110 Increase in Net for 1925—Bus Earnings Represent Substantial Part of Transportation Revenue

Operating revenues of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., from transportation of passengers, freight and express for the year ended Dec. 31, 1925, were \$10,615,589, an increase of 2.17 per cent over the year 1924.

Operating revenues of the electric and heating departments were \$13,377,063, an increase of 9.92 per cent over 1924.

The percentages of operating revenues of the various utilities appropriated for maintenance and depreciation of physical property were as follows:

	Per Cent
Railway	23.07
Electric light and power.....	12.34
Heating	17.96

Net income available for the payment of dividends was \$2,838,831.

Net capital expenditures for additions to and betterment of property during the year were \$4,536,653, after deducting replacements and property withdrawn from service. The principal items have been summarized by the company as follows:

Railway utility	\$1,373,212
Electric and heating utilities.....	1,143,357
Power and miscellaneous.....	2,020,083

Expenditures in the railway utility include principally the addition of new track at the end of the Vliet Street and First Avenue lines, betterment of approximately 13 miles of track in the city and suburbs of Milwaukee, including heavier type of construction to meet the heavier present-day traffic conditions.

The company acquired a private right-of-way from 35th Street and St. Paul Avenue in a general westerly direction through the Menomonee Valley and the town of Wauwatosa to connect with its present Watertown interurban line at a point just east of the North-western belt line crossover in the town of Greenfield. Grading work has been

started and some trestle work erected. This improvement, when completed, will permit of a more direct route to the Land O'Lakes over the Waukesha-Oconomowoc-Watertown interurban line and will considerably shorten the schedule running time.

Nineteen new buses were acquired for passenger service on the Wisconsin Motor Bus Lines.

The company purchased a 99-year leasehold and option to purchase on property situated at the southeast corner of Sycamore and Second Streets, directly east and across the street from the Public Service Building. With this acquisition the company now controls a valuable site, which, at present, is being used as a central parking station in connection with the operation of its bus service.

During the year the company continued to obtain a substantial amount of its capital requirements from the sale of preferred stock offered to investors through its securities department.

At a special meeting held Dec. 21, 1925, the stockholders approved the recommendations of the directors that the authorized capital stock be increased from \$40,000,000 to \$80,000,000, to consist of \$40,000,000 preferred capital stock and \$40,000,000 common capital stock and that the par value of the common capital stock be changed from \$100 a share to \$20 a share.

Subject to the approval of the Railroad Commission the directors authorized the issue of \$4,000,000 par value of additional 7 per cent preferred stock, of which \$700,000 was issued to acquire the capital stock and notes of the Wells Power Company. Of the total amount of \$11,000,000 of 7 per cent preferred stock now authorized, \$6,896,900 had been issued and was outstanding as at Dec. 31, 1925, and \$803,100 par value additional had been subscribed for on the installment plan. The company now has approximately 12,000 holders of its preferred stock, exclusive of subscribers to stock on the installment payment plan.

The only financing done by the company during the year 1925 consisted of the issuance of \$1,696,700 par value of 7 per cent preferred stock placed for

STATISTICS OF RAILWAY OPERATION AT MILWAUKEE

	1925	1924
Miles of track owned.....	419.28	418.72
Miles of track leased.....	1.90	1.56
Miles of revenue track operated.....	391.49	391.08
Revenue passengers carried.....	150,591,216	150,857,684
Transfer passengers carried.....	53,635,554	52,306,065
Per cent transfer to revenue passengers.....	35.61	34.67
Receipts per revenue passenger.....	\$0.0677	\$0.0664
Number of passenger cars owned.....	861	870
Number of passenger motor buses owned.....	124	107
Kilowatt station demand (railway and light).....	166,200	146,900

cash at par. The net additional 7 per cent preferred stock subscribed for under the installment payment plan during the year was \$504,800; \$150,000 of 5 per cent serial notes matured on July 1, 1925, and were paid; \$225,000 of refunding and first mortgage bonds were retired during the year through sinking funds; \$6,500,000 of consolidated first mortgage 5 per cent bonds matured on Feb. 1, 1926, and were paid, the cash required therefor having been obtained by the issue and local sale of preferred stock, the purchase of \$3,750,000 par value of additional common stock by the North American Edison Company and by cash advanced by the latter company.

At a special meeting held on March 23, 1925, the stockholders voted to accept the "service-at-cost and municipal contract" ordinance passed by the Common Council of the city of Milwaukee on March 2, 1925, and accepted by action of the board of directors of the company on March 9, 1925. This ordinance was approved by the Railroad Commission on March 24, 1925. At the special election held April 7, 1925, the ordinance was defeated by referendum vote of the electorate of the city of Milwaukee and finally rejected.

It is explained that in the transportation revenues of the company there is included a very substantial amount derived from bus operation.

William W. Coleman, Milwaukee, has been elected a director and member of the executive and finance committee to fill the vacancies in these offices created by the death of John I. Beggs, former president of the company.

Gross Off, but Net Larger, in Indianapolis

Gross earnings of the Indianapolis Street Railway, Indianapolis, Ind., in 1925, the first full calendar year in which a 7-cent basic fare prevailed, were \$51,806 less than in 1924. This was made plain in a report for the twelve months filed on Feb. 13 with the Indiana Public Service Commission. The gross last year was \$5,536,369. The shrinkage is attributed to increased bus competition and a substantial decline in the total number of passengers carried owing to unfavorable industrial conditions experienced for a part of the year.

Despite the lower gross revenue, however, the report shows a net revenue of \$487,741 for the year. In 1924 the net revenue was \$484,965. Operating expenses were lower last year than in

INCOME ACCOUNT OF THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

	1925	1924
Operating revenues.....	\$23,992,653	\$22,559,912
Operating Expenses:		
Ordinary operating expenses.....	\$14,415,619	\$14,169,176
Depreciation (reserve credit).....	1,847,077	1,627,102
Taxes.....	2,160,755	1,757,306
Total operating expenses.....	18,423,452	17,553,585
Net operating revenues.....	\$5,569,200	\$5,006,327
Non-operating revenues.....	357,675	252,884
Gross income.....	\$5,926,875	\$5,259,211
Interest Charges:		
Interest on funded and unfunded debt.....	\$2,574,457	\$2,454,117
Interest on depreciation reserve balances.....	471,814	438,978
Interest on other reserve balances.....	41,772	40,393
Total interest charges.....	\$3,088,043	\$2,933,489
Net income.....	\$2,838,831	\$2,325,721

EARNINGS OF THE INDIANAPOLIS STREET RAILWAY

	1925	1924
Gross earnings	\$5,536,369	\$5,588,176
Operating expenses..	4,032,821	4,083,749
Net earnings.....	\$1,503,548	\$1,504,427
Taxes	\$386,624	\$384,354
Fixed charges.....	629,182	635,107
Net revenue.....	\$487,741	\$484,965
Sinking fund	\$146,566	\$130,000
Dividend paid.....	150,000	300,000
Dividends accrued— not paid.....	150,000	.....
Total deduction...	\$446,566	\$430,000
Surplus	\$41,175	\$54,965

1924. Two quarterly dividends during the year were deferred. A condensed statement for the two years is presented in the accompanying table.

Rehabilitation of Detroit United Makes Progress

No financial statement has been issued by the receivers of the Detroit United Railway, Detroit, Mich., for the year 1925. It is probable that some report will be made to the creditors, but the stockholders do not now figure to any extent since their failure to finance the reorganization. Reports have been made for various committees, including those representing the bondholders, but no complete financial report has been issued. Progress in rehabilitating the system is reported by the Security Trust Company, Detroit, receiver. Economies in operation are being effected, but no prophecies are made about the outcome. Rumors of reorganization plans are heard, but nothing definite has materialized.

Another St. Louis Reorganization Move

Rolla Wells, receiver of the United Railways, St. Louis, Mo., on Feb. 13 applied to the United States District Court for permission to enter into a contract with the reorganization committee for the railway whereby \$4,200,000 of receiver's certificates will be paid in full in cash and \$4,100,000 of underlying bonds will be exchanged for general 4 per cent bonds.

The plan is to have the receiver pay \$2,300,000 in cash and the reorganization committee \$1,900,000 to take up the receiver's certificates. The underlying bonds would be surrendered by the present holders in exchange for 4 per cent bonds. The reorganization committee would receive \$6,000,000 in general 4s for its cash and the underlying bonds to be taken up. There are now outstanding \$30,300,000 of the general 4s.

The question of issuing the \$6,000,000 of additional general 4s held up the reorganization of the company. There was a serious question about exchanging the underlying bonds for general 4s, but Sam Mitchell, counsel for the bondholders of the St. Louis Transit Company, recently told the court that this objection had been removed. The application of Mr. Wells substantiates Mr. Mitchell's statement. It also indicates that the railway proper-

ties will shortly be foreclosed under the \$9,790,000 transit bond issue.

The receiver regards it as for the best interest of the company that an early reorganization be brought about and adds that a plan for a friendly foreclosure under the transit company 5 per cent mortgage has been arranged by financial interests of the company.

Outstanding underlying bonds due since Oct. 1, 1923, include \$1,474,000 of Lindell Railway, \$1,640,000 of Cass Avenue & Fairgrounds and \$986,000 of Merchants Terminal Railroad.

Disposition of Ohio Interurban Undecided

Sale of the electric light and power properties of the Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio, to the Cleveland Electric Illuminating Company, noted in the ELECTRIC RAILWAY JOURNAL for Jan. 23, page 174, naturally provoked questions about the probable disposition of the railway. It is understood now that this is a matter still to be decided. It will probably not work itself out until later. The electric light and power service was the more profitable of the two operations of the company. Since this end of the business has been sold it will remain for future developments to determine whether or not the railway service is to be continued. The railway operates 38 miles of track.

Commission Authorizes 13 Miles Abandoned in Chautauqua

The Public Service Commission on Feb. 5 authorized the Chautauqua Traction Company to abandon that part of its route between Ashville and Mayville, Chautauqua County, a distance of 13.4 miles. Two short sections of track of this company are to be retained, one section, from Lakewood to Ashville, being transferred to the Jamestown Street Railway and the other, in the village of Westfield, being transferred to the Jamestown, Westfield & Northwestern Railroad. The opinion of Commissioner Pooley, who heard the case, points out that the road has sustained substantial losses in every year since 1909, and it has not earned operating expenses in any year since 1918.

He said further that in the last abandonment proceeding it was claimed that the interests controlling both the Chautauqua Traction Company and the Jamestown, Westfield & Northwestern Railroad were diverting business from the traction company to the railroad, and while this claim was not made in this proceeding, the commission was in receipt of communications to that effect, with the intimation also that these companies were not receiving all revenues to which they were entitled by reason of the issuing of passes for free transportation to various persons. The commission has considered the facts and the evidence taken shows that the railroad has not been, and is not, earning its fixed charges; the deficit for the past two years being approximately \$50,000 a year. As to free transportation it was shown that at the time the properties came under the control of the representatives of the estates of

Messrs. A. N. and S. B. Broadhead, 120 passes were outstanding. This number has since been reduced to 40, and passes have been strictly confined to those who may receive them under the statute.

Syndicate May Purchase West Milton Line

A syndicate composed of residents and shippers living along its route is being organized to purchase the Dayton, Covington & Piqua Traction Company, West Milton, Ohio. The line was offered at a receiver's sale recently and no bids were made. The lowest bid possible for the line, which is 30 miles long, was fixed at \$150,000. The syndicate, it was said, contemplates making arrangements with the special master in the receivership, and a new minimum rate may be set. Sale of the line must be approved by Federal Judge Smith Hickenlooper of the Southern district of Ohio before the sale can be consummated.

The commission authorized abandonment of the line a few months ago. In its petition for abandonment the company declared it had been operating at a loss due to automobiles and buses cutting down the patronage.

Receivers Sought for Rockford Properties

Suit for the appointment of a receiver for the Rockford & Interurban Railway and the Rockford City Traction Company, Rockford, Ill., because of non-payment of interest on bonds, has been filed by trustees on demand of the bondholders. The Union Railway, Gas & Electric Company is named a party to the bill. The petitioner is the Continental & Commercial Trust & Savings Bank, Chicago, trustees. The petition is returnable to the April term of court.

The two lines are subject to liens secured by bonds to the amount of \$1,650,000. The first issue was in 1902 of \$800,000 for construction of the railway and a further issue of \$1,459,000 was made for equipment. From earnings, \$574,000 bonds were purchased and set aside from time to time as a sinking fund. The entire issue was payable on Oct. 1, 1922, but an extension was arranged until Oct. 1, 1930, all holders, except those whose bonds totaled \$32,000, accepting.

At that time, to prevent foreclosure proceedings and the loss of \$400,000 of notes held against the company for equipment, the Union Railway, Gas & Electric pledged certain securities. These included notes for \$83,675 and an open account for \$374,857. Under the agreement for the extension, provision was made for annulment in case the company, as a party to it, did not pay the interest on the bonds. Payments were made until April, 1925, but in October of that year payment was again passed.

The Continental & Commercial Trust & Savings Bank, which is bringing action, has resigned as trustee for holders of the bonds against the interurban lines. The company, however, is still trustee for a \$1,650,000 bond issue. In the name of the holders of these

bonds it is instituting the action. The bonds, originally issued to cover local properties and the Belvidere inter-urban line, also are a lien against the Rockford & Freeport and Rockford, Beloit & Janesville lines to the amount of \$1,250,000, but no action is instituted in this case.

\$99,929 Surplus at Pittsburgh

For the year recently closed the Pittsburgh Railways, Pittsburgh, Pa., reports a surplus of \$99,929. Car riders last year paid an average of 5.77 cents for each ride, according to the railway. This compares with 6.62 cents as average fare for 1924. Weekly, Sunday and holiday passes were largely responsible for this reduction, and in the closing months of 1925 the average fare received was almost 29 per cent less than that for the same period the preceding year.

\$1,700,000 in P. R. T. Certificates

Equipment trust certificates of the Philadelphia Rapid Transit Company, Philadelphia, Pa., to the amount of \$1,700,000, bearing interest at 5 per cent and priced to yield about 4.75 to 5.35 per cent, are being offered by Dillon, Read & Company, New York. These certificates, known as equipment trust, series J, are issued under the Philadelphia plan and will mature in equal annual installments from Feb. 15, 1927, to Feb. 15, 1936. The purpose of the issue is to pay in part for new equipment to be constructed at a total of not less than \$2,283,750. The equipment includes 50 standard double-truck vestibule street railway passenger cars, 75 double-deck motor coaches and 60 single-deck motor coaches. The par value of the certificates will represent less than 75 per cent of the cash cost of the equipment. Some facts about this equipment were given in the *ELECTRIC RAILWAY JOURNAL*, issues of Feb. 6 and Feb. 13.

Long Island Lines to Be Sold

The New York & Long Island Traction Company, New York, N. Y., will be sold at public auction at the County Court House at Mineola, L. I., on Feb. 25, following a ruling of the Supreme Court of Nassau County in pursuance of a judgment of foreclosure and sale brought by the Union Trust Company as trustee plaintiff. The property will be sold in five parcels, including franchises, rolling stock, real estate and certain trackage rights and personal property. The sale will also include the Long Island Electric Railway, which company is also controlled by the Long Island Consolidated Electric Companies. George Le Boutillier, vice-president of the Long Island Railroad, recently announced that the notice of the sale of these companies meant that operation of cars on both lines would be discontinued. The New York & Long Island Traction Company operated 41 miles of line, connecting Mineola, Garden City, Freeport and other important points on Long Island and the Long Island Electric operated 25 miles of line connecting Brooklyn and Far Rockaway.

Suit to Hold Up Seattle-Rainier Sale

Fight by Rainier Valley residents to block a referendum vote on the purchase by the city of the Seattle & Rainier Valley Railway was delayed in the Superior Court, when Judge Malcolm Douglas granted the motion of Arthur Schramm, assistant corporation counsel, for a continuance of the hearing on the show cause order issued against City Comptroller Harry W. Carroll. Judge Douglas did not set a definite time for the hearing.

Even if the court action had not been brought, the referendum could not go before the voters at the March 9 election owing to the legal requirement that its validity must be certified 45 days before a regular election. When the referendum is submitted to popular vote, if such proves to be the case, it must be at a special election.

Rainier Valley residents obtained a temporary restraining order preventing the City Comptroller from certifying the petitions to the City Council and restraining the making of a report on the petitions to the Council. The opponents of the referendum proposed assert that the petitions are illegal, that only the petitions which were filed on Dec. 26 and which contained only approximately 4,000 signatures are legal.

Quarterly Earning Statements in Philadelphia.—The income account statement of the Philadelphia Rapid Transit Company, Philadelphia, Pa., heretofore prepared and printed monthly for the information of stockholders, will hereafter be issued quarterly to coincide with the dividend period on P.R.T. common stock. The next income account statement will accordingly be issued during April for the first three months of 1926.

Deficit in 1925.—For the year ended Dec. 31, 1925, the gross income of the Portland Railroad, leased by the Cumberland County Power & Light Company, of Portland, Me., was \$1,451,902, against \$1,582,264 in 1924. The operating expenses and taxes for 1925 were \$1,178,574, against \$1,294,781 the year previous. The net income was \$25,730 in 1925, against \$39,885 in 1924. After the consideration of dividends, which for both years amounted to \$99,950, operation in 1925 resulted in a deficit of \$74,220, against a deficit of \$60,065 in 1924.

Judgment of \$110,535 Against Urbana Line.—Settlement of the affairs of the Kankakee & Urbana Traction Company, Urbana, Ill., is progressing rapidly. Judge Smith recently approved the report of the master, without objection, entering judgment for \$110,535 against the road and directing its immediate and absolute sale. The date, however, has not yet been set. T. B. Webber, vice-president and secretary of the line, was recently appointed receiver. The property includes trackage and right-of-way from Urbana to Paxton, four cars and a station at Rantoul.

Loan Authorized.—The Indiana Public Service Commission recently approved a petition of the Hammond, Whiting & East Chicago Railway, Ham-

mond, Ind., to negotiate a \$20,000 loan and to issue three notes of \$24,766 each. The notes will be taken by the Chicago City & Connecting Railways collateral trust. They represent a refunding of the unpaid balance of money advanced to the issuing company in 1918 by the United States Housing Corporation to extend lines and to buy new equipment for increased service to factories engaged in war work.

Business of Railway Concluded.—A decree approving the findings of the receiver in the case of the Alamance Railway and ordering distribution of funds was received recently to be filed in the office of the clerk of the Western North Carolina District Court at Greensboro, N. C. The decree is concerned with the winding up of the affairs of the company and distribution of funds to the bondholders, for whom the American Trust Company, Richmond, Va., is acting. The Alamance Railway formerly operated a street railway system in Burlington and Alamance and between these two towns. Cars have not been run for several years.

Net Income in Worcester, \$349,735.—The net income of the Worcester Consolidated Street Railway, Worcester, Mass., for the year ended Dec. 31, 1925, was \$349,735, or \$7.77 a share, compared with \$362,504, or \$8.05 a share, in the preceding year. As of Dec. 31, 1925, current assets were \$1,208,420 and current liabilities \$569,129, leaving net working capital of \$639,291. For the quarter ended Dec. 31, 1925, net income was \$223,895 after charges, equivalent to \$4.97 a share on the 45,000 shares of capital stock outstanding, compared with \$53,144, or \$1.18 a share, in the corresponding quarter in 1924.

May Discontinue Electric Line.—Contending the service is being operated at a loss of \$5,000 a month, the Missouri Pacific Railroad contemplates the discontinuance of the Coal Belt Electric Railway, Marion, Ill. It is reported attorneys for the railroad are preparing briefs to present their case before the Illinois Commerce Commission to discontinue the service. The Coal Belt Electric Railway, operated by the Missouri Pacific, a steam road, is 14 miles long, extending through Marion, Herrin, Carterville and Energy.

Easements Should Be Included in Valuation.—An opinion has been given the Maryland Public Service Commission by Thomas H. Robinson, Attorney-General of Maryland, holding that easements should be included in the commission's valuation of the property of the United Railways & Electric Company, Baltimore. Following shortly after the ruling the United made an announcement that no matter what valuation was placed on the property there would be no increase in fares. The present fare is 7½ cents. During the hearings Clarence W. Miles, people's counsel, said that if easements were included it was probable that he would take the case into the courts. Before the commission took any action it sought the opinion of the Attorney-General. Mr. Miles will make a close study of the ruling before he decides what action to take. The United placed a valuation of almost \$18,000,000 on easements during the hearing.

Personal Items

John H. Hanna President Capital Traction

Chief Operation Official of Washington
Property Made Executive Head
of the Company

John H. Hanna, vice-president in charge of operations of the Capital Traction Company, Washington, D. C., for the last ten years, has been elected president to fill the vacancy created by the resignation of George E. Hamilton. His advancement will become effective on March 11, the date of Mr. Hamilton's resignation.

It has, indeed, been a strong combination of talent, this association of Mr. Hamilton and Mr. Hanna on the Washington property. George E. Hamilton knows finance and the law as

than an operator—he is a pioneer. As one instance of this there is the use under his direction of the bus in deluxe service to Chevy Chase, treated in the *ELECTRIC RAILWAY JOURNAL* for Feb. 13.

It has not all been operation with which Mr. Hanna has had to deal in Washington. Legislators down there may be remiss about other things, but they never lose sight of the fact that Washington is the nation's capital. Civic spirit knows no limit. This is commendable, but it is also distressing at times. Commissions have a say in everything, for there is no elected government. It is in just such situations that Jack Hanna is a diplomat among diplomats. His public relations are of the very best. He is well known and well liked, two things that appear always to go together but do not always do so. With the boys of the district Jack Hanna is aces high, as they say. He is a member of the executive committee of the Washington Council of the Boy Scouts. As a matter of fact, there is not much that is planned for this organization in which Mr. Hanna does not take a hand.

Relation of this particular activity of the man may appear to be far removed from railway operation. It is. But every man is a composite. Few live by bread alone. Jack Hanna likes to fish and he likes to play golf. One of these predilections testifies to the ability of the man to amuse himself when thrown upon his own resources—a great test in this age—and the second testifies to the ability of the man to amuse himself when thrown on somebody else's resources.

Mr. Hanna has long been active in affairs of the American Electric Railway Association. He was president of the Engineering Association 1913-1914, and in addition to being a member of the executive committee in 1925 he had a prominent part in the work of many other committees. Included among these were the 1925 committee of the mid-year meeting and dinner arrangements, of which he was chairman, the committee on national relations and the committee on subjects and meetings. He was the association's national counselor to the United States Chamber of Commerce. This year he is a member of the executive committee and chairman of its membership committee and chairman of the sub-committee of the national relations committee on depreciation.

After leaving college Mr. Hanna engaged in steam railroad engineering work and then entered the service of the Washington & Georgetown Railroad, predecessor of the present traction company. The following year he was appointed assistant superintendent and four years later became superintendent and assistant engineer of the company. In 1909 he was appointed chief engineer in charge of all construction and maintenance. Then in 1916 he became vice-president.

Mr. Hanna was born in Henderson, Ky., in 1871. He acquired his early education in the high and private schools of his home town, and was graduated from Princeton in 1892 with the degree of civil engineer.

C. C. Castle in New Post

Executive Well Known in Equipment
Field Joins New American Car &
Foundry Motors

C. C. Castle will become actively associated with the American Car & Foundry Motors Corporation on April 1. At that time he will sever the business affiliation with B. A. Hegeman, Jr., which has extended over a long period. For years one of the most outstanding figures in the railway field, Mr. Castle will carry to his new association an enormous amount of prestige and of good will. The name Charlie Castle is a byword on the lips of both old timers and newcomers alike in the industry.

He has been associated with Mr.



J. H. Hanna

few other men do. Equally as much can be said of Mr. Hanna about his familiarity with engineering and his knowledge of transportation. Under the new arrangement of personnel the responsibilities of the two men are readjusted, but the association remains, for, as explained elsewhere in this issue, Mr. Hamilton continues as chairman of the executive committee.

George E. Hamilton makes no pretensions to being a street railway man as that term is generally applied. Neither does Jack Hanna, for that matter. No man, however, can escape the estimate put upon him by his contemporaries. In the case of Jack Hanna that estimate places him well up at the top, if not actually at the top. For 32 years now he has served the one company, a company that reflects, more than do many others, the ideas and ideals of a single officer, now made its head. If ever a property were well kept up, it is the Capital Traction. Remember, too, that it is an underground conduit road. As for the cars, they are the last word in both appurtenances and appearances. Jack Hanna was one of the first men in the industry fully to appreciate the pulling power of paint with the public. He is more



C. C. Castle

Hegeman ever since May, 1910, and the milestone of each passing year has testified mutely to the progressive activity of that well-known partnership. As first vice-president of the National Railway Appliance Company, vice-president of the Hegeman-Castle Corporation, vice-president of the Anglo-American Varnish Company and one time vice-president of the Genesco Corporation, Rochester, N. Y., the force of Mr. Castle's personality has long made itself felt. Lately, the press of duties has made it impossible for him to continue as vice-president of the Genesco Corporation and he accordingly resigned from that office and became the secretary of the corporation.

Mr. Castle has for years taken an active interest in the affairs of the electric railway industry. While the American Electric Railway Manufacturers Association was still in existence, he served as president of that organization. He is a manufacturing member of the executive committee of the Railway Supply Manufacturers Association, a member of the finance committee of the New York Railroad Club and a member of the New England Street Railway Club. He belongs to the Railway Club of New York and is a member

of the admissions committee of the Lotos Club of New York.

Prior to his association with Mr. Hegeman, Charlie Castle was vice-president of the Hildreth Varnish Company. In fact, these have been the two principal business affiliations of his long and active career. He was born in Syracuse, N. Y., on a date known only to himself. He early exhibited a penchant for railway affairs. At the age of sixteen he entered the employ of the Merchants Dispatch Transportation Company, Syracuse, N. Y. After a brief period spent in this work, he became attached to the Sherwin-Williams Company and remained with that company for approximately three years. Then came an offer of an opening with the Hildreth Varnish Company and the growth of his extraordinarily wide acquaintanceship throughout the railway field.

R. J. Ritchie Advanced by Fitkin Interests

Ralph J. Ritchie, operating vice-president of the Jersey Central Power & Light Company, southern division, has been transferred to the New York office as operating manager of Fitkin Utilities under the management of the General Engineering & Management Corporation.

Mr. Ritchie's new assignment is a promotion for meritorious service. To him was assigned the difficult task of consolidating the various properties which now comprise the Jersey Central southern group. He had been a year and a half in the territory.

As operating manager Mr. Ritchie will have reporting to him the supervisors of the group divisions of Fitkin utilities.

George E. Hamilton Resigns at Washington

George E. Hamilton has resigned as president of the Capital Traction Company, Washington, D. C., effective March 11, which will be the eighteenth anniversary of his election to that office. His resignation was presented at a meeting of the board of directors on Feb. 11. It was accepted with the understanding that he would continue to serve the company as general counsel and as chairman of the executive committee. Mr. Hamilton gave as his reason for resigning his desire to devote more time to professional employment and personal matters.

When Mr. Hamilton took over the presidency of the Capital Traction Company in 1908 he succeeded the late George P. Dunlop. Mr. Hamilton continued, however, as senior member of the law firm of Hamilton, Colbert, Yerkes & Hamilton. Prior to his assuming the presidency of the company he was a director and legal representative in Washington City of the Baltimore & Ohio Railroad and lecturer on wills and legal ethics in the Georgetown Law School, of which he was formerly dean.

In his official resignation he said the eighteen years of his official life had been "eventful ones in the history of our company—years filled with difficulties overcome, dangers avoided and with fair accomplishment in a safe and useful direction."

W. H. Kennedy Auditor for Chicago Surface Lines

W. H. Kennedy has been appointed auditor of the Chicago Surface Lines, succeeding J. J. Duck, resigned. R. E. Eddy has been promoted from the position of auditor of receipts, which he has held for the past six years, to the position of assistant auditor.

Mr. Kennedy went to the Chicago



W. H. Kennedy

property from the Western United Corporation at Aurora. Previous to that he was for five years assistant treasurer of the Savannah Electric & Power Company, Savannah, Ga. He has been connected with Stone & Webster properties for 25 years, serving, in addition to those mentioned, with the Lowell Electric Light Corporation, Lowell, Mass.; Edison Electric Illuminating Company, Brockton, Mass.; Electric Light & Power Company, North Abington, Mass.; Cape Breton Electric Company, Sydney, N. S.; Keokuk Electric Company, Keokuk, Iowa, and the Houghton County properties, Houghton, Mich.

Previous to his Chicago connections



R. E. Eddy

Mr. Eddy served with so-called Hodenpyl-Hardy companies, including the Springfield Consolidated Railway and the Springfield Gas Company, Springfield, Ill., of which he was assistant secretary; Kalamazoo Gas Company, Michigan Light Company and Consumers' Power Company at Kalamazoo, Mich.

The positions of general auditor, auditor of receipts and auditor of disbursements, the latter held by I. C. Shellenberger, have been discontinued by the Surface Lines.

It is understood that Mr. Duck's status with the Chicago City Railway remains unchanged.

"Pop" Shepherd's Record

Versatile Employee of New Jersey Road in Service Thirty-five Years

Look to your laurels, men in electric railway work who pride yourselves on your records of continuous service in the industry! William H. Shepherd, Jersey City, doesn't actually challenge you, but his record is attracting much attention in New Jersey. Thirty-five years in the railway business with Public Service Railway and predecessor companies—that's the record of Mr. Shepherd. He started Jan. 9, 1891, as a conductor in Jersey City on the Erie Street horse car line of the Jersey City & Bergen Railway, and he is now assistant to the general superintendent of Public Service Railway.

Working as a conductor on various lines of the Jersey City & Bergen Railway and later the Consolidated Traction Company until 1894, Mr. Shepherd was then appointed an inspector. Subsequently, he was starter at various carhouses in Jersey City for the Consolidated Traction and the North Jersey Railway. When the Public Service Railway started in 1903 Mr. Shepherd took a position in the employment office in Hoboken, later was a clerk in the Hudson Division office and in 1904 was transferred to the time-table department. The headquarters of the company were moved to Newark that year and Mr. Shepherd went along to take a position in the passenger agent's department, soliciting special car business. The following year he was transferred back to the time-table department, also in Newark, and remained there until 1923, when he was appointed to his present position. Mr. Shepherd started in the time-table department as a clerk and rose to the position of assistant superintendent of the department.

Popularly known among the trolley-men as "Pop," Mr. Shepherd organized the Public Service Railway Athletic Association and was active in promoting track and field sports, baseball leagues and pool tournaments. The first annual outdoor meet of the association was held in 1912 at Hilton oval, near Newark, and an indoor track meet was held in the Fourth Regiment Armory, Jersey City, the same year. His own ability as an athlete qualified him for this work. In those days he wore the silks of the Scottish-American A. C. Later he joined the Wayne A. C. and gradually changed from distance runner to sprinter, hurdler and jumper. His best mark for the 100-yard dash was 10.1; for the standing broad jump, 10 ft. 3 in., and the standing high jump, 4 ft. 11 in., the latter two marks being made indoors.

As an indication of the popularity of Mr. Shepherd with the rank and file in Public Service Railway, it is recalled

that in 1915, when a New York newspaper conducted a contest to determine the most popular railway man in the Metropolitan district, Mr. Shepherd not only won first prize—a trip to the San Francisco Exposition, with all expenses paid—but, through the loyal support of the trolley men of the Public Service he polled 3,000,000 votes, beating his nearest competitor by almost 1,000,000.

Mr. Shepherd is a member of the veterans' organization of the Fourth New Jersey Infantry. He was a captain in the Fourth Infantry on the border during the Mexican trouble in 1916, and among his treasures is a watch fob given him by the enlisted men of his command, a further proof of the high esteem in which he is generally held.

W. L. Briar Made Shop Supervisor at Kansas City

W. L. Briar has been appointed shop supervisor of the Kansas City Railways, Kansas City, Mo., reporting direct to R. S. Neal, assistant superintendent of equipment. All shop foremen now report to Mr. Briar. To correlate the shop and division mechanical work, all division foremen report to Mr. Briar on all mechanical repairs and replacements. Reports, records, etc., are handled through the office of the assistant superintendent of equipment, with materials handled through the office of supervisor of materials.

Dean W. Flowers, formerly general superintendent for the St. Paul Gas Light Company, has joined the engineering staff of the American Light & Traction Company in San Antonio, Tex. That company at one time controlled the St. Paul Gas Light Company and now owns the San Antonio Public Service Company and other utility organizations.

H. G. Milson has been appointed director of personnel of the Toronto Transportation Commission, Toronto, Canada, replacing Dr. S. G. Mills, who has returned to private practice. W. H. C. Seeley, who served for some time as assistant to Dr. Mills, has been appointed assistant director of personnel.

Henri Camp, general secretary of the Union Internationale de Tramways, de Chemins de fer d'Intérêt Local et de Transports Publics Automobiles, has resigned to engage in business. The executive committee of the association, which is made up of electric railways and bus lines in western Europe, has appointed in his place André de Backer, engineer. Mr. de Backer's appointment dates from Jan. 1, 1926.

Paul Kayser, widely known in newspaper and business circles in Wisconsin, has joined the staff of the Milwaukee Electric Railway & Light Company to take charge of publicity work.

J. M. Markham, general agent of the Northwestern Mutual Life Insurance Company, has been elected president of the City Railway, Dayton, Ohio, succeeding Valentine Winters, who served as president since 1921 and has also been a member of the board for years. Mr. Markham accepted the nomination of the board only under condition that

the position be an honorary one and that it carry no compensation. Heretofore the office of president carried a salary of \$15,000 a year.

F. P. Snyder General Manager of Oakwood Street Railway

Fred P. Snyder has been appointed general manager of the Oakwood Street Railway, one of the five railway companies entering the city limits of Dayton, Ohio. In announcing his appointment directors of the company said that his experience made him the logical man for the position. Mr. Snyder was appointed superintendent of transportation and equipment of the Oakwood Street Railway a few years ago, after several years in charge of the shops. For many years prior to his association with the railway he was associated with



F. P. Snyder

the Barney & Smith Car Company, Dayton. He brought to his railway position a thorough knowledge of car building, maintenance of rolling stock and technical data on electric transportation.

Ed Crawford was recently elected secretary-treasurer of the Shreveport Railways, Shreveport, La. Mr. Crawford is the son of the late Captain Crawford, who was vice-president of the company and one of the pioneers in the Southern transportation field. Captain Crawford was succeeded by Ed Jacobs.

Obituary

Donald McColl

Donald McColl, formerly general manager of the Shanghai Electric Tramways, Shanghai, China, died recently at Seaford, England. For a number of years he was connected with the Glasgow Corporation Tramways, but he left that position to go to Lisbon to become traffic superintendent and chief accountant of the tramways there. Later he returned to England and assumed the position of general assistant to his old Glasgow chief, the late John Young, who at that time was general manager of the London Underground Railways. Mr. McColl took part in the electrification and reor-

ganization of the Metropolitan District Railway, and in the starting and development of three new tube railways in London. In 1908 he was appointed to the Shanghai tramways, owned by a British company. Under his management the tramways there were developed and transformed into a profitable undertaking. Mr. McColl was the author of a standard work on tramway bookkeeping and accounts.

Thomas E. Leahey, superintendent of the line department of the Public Service Railway, Newark, N. J., is dead. He was 59 years of age. Mr. Leahey entered the street railway field in 1889, when he became a lineman for the Newark Passenger Railway, one of the predecessors of the Public Service. When the several street railways merged to form the present traction company Mr. Leahey remained as an employee of the new corporation.

Anthony B. Calvin, well known as an attorney, at Youngstown, Ohio, died from heart disease on Feb. 7. For many years Judge Calvin was counsel for the Youngstown & Suburban Railway. He was born in Mahoning County on March 13, 1877, grew up on his father's farm and was educated in the district schools of the county. He was graduated from Northeastern Ohio Normal College at Canfield in 1897 and in 1900 from the law school of Ohio State University. Following this, he was admitted to the bar and had practiced his profession in Youngstown since that time.

David T. Goff, general roadmaster of the Southern Ohio Public Service Company, Columbus, Ohio, died recently at his home in Newark, Ohio. He had been associated with electric railways from the time of the first interurban lines in Ohio. He helped in the construction of the city lines in Newark and Zanesville and interurban lines connecting Columbus, Newark and Zanesville. With the exception of seven years during which he served as a motorman with the Ohio Electric Railway, he has been in the construction and maintenance of way department of the Ohio Electric Railway and its successor the Columbus, Newark & Zanesville Electric Railway and later the Southern Ohio Public Service Company. He was 64 years old.

Carter Miller, advertising manager of the Timken Roller Bearing Company, Canton, Ohio, is dead. Mr. Miller went with the Timken Company six years ago and was promoted rapidly to various positions both in the field with the Timken Roller Bearing Service & Sales Company and at the home office with the Timken Roller Bearing Company. Later he was placed in charge of the advertising department. Mr. Miller was born in Bay City, Mich. He attended the elementary schools in that city and was graduated from Kenyon College at Gambier, Ohio, in 1919. In the business world he was recognized as a keen analyst of advertising and business problems. His advice and counsel were frequently sought in a consulting capacity in matters connected with advertising and in solving publicity problems.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Oil Men Have Their Say

A Material Stiffening of Prices Is
Anticipated—More Uniform
Production for the
Future

Characterizing as mere propaganda for big advances in prices the statements that the petroleum reserves of the country are in immediate danger of being exhausted, an official of one of the larger oil producing companies declared that such an eventuality need not be looked for now or in the near future. What the industry needs more than anything else at the present time, in his opinion, is a movement toward permanent stabilization of prices and production. The disastrous slumps in oil and gasoline prices and the periods of inordinate profits are alike unjustified.

This applies with telling force in the case of the railways. Whether oils are purchased on a basis of the gallon or on the basis of mileage, it is undesirable to be subjected to heavy fluctuations from one year to the next. The stabilized basis for prices will be arrived at only when all of the larger companies in the field have seen the light and have called off their respective entrants from the "industrial dog fight."

Prices, under this new order of things, will not be low. However, the quality of oils sold will average considerably higher and the various grades will be more uniformly standardized. It is often the case, at present, that an operator using a certain grade of oil will find enormous variations from one delivery to the next. This does not make for economical operation and for proper maintenance procedure. The distributing oil companies cannot be entirely blamed for such a condition at the present time, since the oils are obtained from such widely divergent spots and are produced under varying conditions.

This condition was mentioned by one official as an argument for a monopolistic control of the industry. Only under such an arrangement, he feels, can the shoestring operator be excluded, along with his production of oils of doubtful quality. Whether or not the companies which exercised this control would be content to allow prices to remain at a reasonable level is open to conjecture. However, in a free country, there is nothing to prevent the entrance of outside capital into drilling ventures, in case the leaders become unduly obstreperous in handling the situation.

Two are not one as yet, since one company is predicting an immediate stiffening of prices on both oils and gasoline, while another cannot see any prospect of such a move in the near future. The weight of opinion seems to favor the former view, however, although no one apparently anticipates

a major advance within the next few months.

Oil companies are looking with considerable interest upon the ever-increasing adoption of co-ordinated bus and trolley service by the railways. Since the oils used in buses are of a much higher quality than the grades required for street car operation and, further, since buses require vastly larger quantities of oil than do their adopted cousins, the cars, it is quite natural that this new business should look very tempting to the producing companies. While the exigencies of bus lubrication are very complex, as compared with the trolleys, and require much careful study so that they may be properly handled, great strides have been and are being made in this direction.

S. M. Curwen Heads J. G. Brill Company—Other Officers

At an organization meeting of the board of directors of the J. G. Brill Company, Philadelphia, Pa., held on Feb. 11, the following officers were elected: President, Samuel M. Curwen; vice-president, James W. Rawle; treasurer, Edward P. Rawle; secretary, Edmund L. Oerter.

H. W. Wolff, vice-president of the American Car & Foundry Company,

was elected a director to fill the unexpired term of Stephen J. Simon, resigned. The selection of Mr. Wolff gives the American Car & Foundry Company five of the nine members of the J. G. Brill Company board. This is in line with the recent formation of the Brill Corporation, a merger on the J. G. Brill Company and American Car & Foundry Company's motor subsidiaries. The Brill Corporation is controlled by American Car & Foundry.

The present personnel of the J. G. Brill Company board is as follows: Samuel M. Curwen, E. P. Rawle, Francis A. Lewis, W. Clarke Mason, W. H. Woodin, W. M. Hager, C. S. Sale, W. C. Dickerman, H. W. Wolff.

Electric Locomotives Now Completely Built in Japan

Japan is making rapid strides in the development of her home industries. As an illustration of this comes the announcement that the Kawasaki Shipbuilding Yard is now manufacturing electric locomotives for use on Japanese railroads. These machines are claimed by the makers to be purely Japanese in all materials, no parts having been imported for use in their erection.

In August last the yard received an order for four 25-ton electric locomotives from the Nippon Denryoku K. K. Two of these were delivered in December and the remaining two are now under process of construction. In addition orders are on hand for twelve units ranging from 41 tons to 73 tons. These will be delivered to various railroads in the country, the largest order, for five 55-ton locomotives, going to the Fuji-Minobu Railway.

ELECTRIC RAILWAY MATERIAL PRICES—Feb. 16, 1926

Metals—New York

Copper, electrolytic, cents per lb.....	14.275
Lead, cents per lb.....	9.125
Nickel, cents per lb.....	35.00
Zinc, cents per lb.....	7.875
Tin, Straits, cents per lb.....	64.25
Aluminum, 98 to 99 per cent, cents per lb.....	27.00
Babbitt metal, warehouse, cents per lb.....	
Commercial grade.....	56.00
General service.....	31.50

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads.....	\$5.00
Somersett mine run, Boston.....	2.30
Pittsburgh mine run, Pittsburgh.....	2.05
Franklin, Ill., screenings, Chicago.....	1.575
Central, Ill., screenings, Chicago.....	1.125
Kansas screenings, Kansas City.....	2.30

Track Materials—Pittsburgh

Standard steel rails, gross ton.....	\$43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.....	2.95
Tie plates (flat type), cents per lb.....	2.25
Angle bars, cents per lb.....	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.....	4.25
Steel bars, cents per lb.....	2.00
Ties, white oak, Chicago, 6 in.x8 in.x8 ft.....	\$1.35

Hardware—Pittsburgh

Wire nails, base per keg.....	2.65
Sheet iron (28 gage), cents per lb.....	3.25
Sheet iron, galvanized (28 gage), cents per lb.....	4.50
Galvanized barbed wire, cents per lb.....	3.35
Galvanized wire, ordinary, cents per lb.....	2.50

Waste—New York

Waste, wool, cents per lb.....	12-18
Waste, cotton (100 lb. bale), cents per lb.....	
White.....	13-17.50
Colored.....	10-14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.*.....	11.70
White lead in oil (100 lb. keg), cents per lb.....	15.50
Turpentine (bbl. lots), per gal.....	\$0.97
Car window glass, (single strength), first three brackets, A quality, discount*.....	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*.....	86.0%
Car window glass, (double strength) all sizes, A quality, discount*.....	85.0%
Putty, 100 lb. tins, cents per lb.....	4-6

* Prices f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.....	16.00
Rubber-covered wire, No. 14, per 1,000 ft....	\$6.25
Weatherproof wire base, cents per lb.....	17.75

Paving Materials

Paving stone, granite, 5 in. New York—Grade 1, per thousand.....	\$147
Wood block paving 3½, 16 lb. treatment, N. Y., per sq. yd.....	\$2.70
Paving brick 3½x8½x4, N. Y., per 1,000 in earload lots.....	51.00
Paving brick 3x8½x4 N.Y., per 1,000 in earload lots.....	45.00
Crushed stone, ½-in., earload lots, N. Y., per cu. yd.....	1.85
Cement, Chicago consumers' net prices, without bags.....	2.10
Gravel, ½-in., cu. yd., f.o.b. N. Y.....	1.75
Sand, cu. yd., f.o.b. N. Y.....	1.00

Old Metals—New York and Chicago

Heavy copper, cents per lb.....	11.875
Light copper, cents per lb.....	10.00
Heavy brass, cents per lb.....	7.375
Zinc, old scrap, cents per lb.....	4.75
Lead, cents per lb. (heavy).....	7.625
Steel car axles, Chicago, net ton.....	\$17.75
Cast iron car wheels, Chicago, gross ton.....	17.25
Rails (short), Chicago, gross ton.....	17.75
Rails, (relaying), Chicago, gross ton.....	25.50
Machine turnings, Chicago, gross ton.....	9.00

*The method of selling linseed oil on a gallon basis has been changed and all sellers now quote on a pound basis.

Data on New Equipment for South Bend

Specifications on a considerable number of cars and electric locomotives ordered some time ago by the Chicago, South Shore & South Bend Railroad, Chicago, Ill., have just become available. This road, now an Insull property, has embarked upon an extensive campaign of modernization and the new rolling stock, which is detailed here, constitutes an important move in this program.

Regular passenger equipment ordered consists of ten combination baggage and passenger motor cars seating 44; six cars with inclosed smoking compartments, seating 48, and nine passenger cars without special modifications, seating 56. These cars are being built by Pullman Company. They were ordered on Aug. 1, 1925, for delivery on June 1 of this year. The specifications follow:

Seating capacity	56
Weights:	
Car body	62,500 lb.
Trucks	32,000 lb.
Equipment	25,500 lb.
Total	120,000 lb.
Booster centers, length	38 ft. 0 in.
Length over all	60 ft. 0 in.
Truck wheelbase	7 ft. 0 in.
Width over all	9 ft. 9 1/2 in.
Height, rail to trolley base	14 ft. 4 1/2 in.
Body	Steel
Interior trim	Mahogany
Headlining	Steel
Roof	Arch
Air brakes	Westinghouse
Armature bearings	Plain
Axles	Standard Steel, heat treated
Car signal system	Faraday single stroke bell
Car trimmings	Adams & Westlake
Side bearings	Stucki
Compressors	D-3-F
Control	Westinghouse
Couplers	Tomlinson
Curtain fixtures	Railway Curtain Supply
Curtain material	Pantasote
Destination signs	Electric Service Supplies
Gears and pinions	Nuttall
Hand brakes	Peacock
Heater equipment	Peter Smith and Railway Utility
Headlights	Electric Service Supplies
Journal boxes	Symington
Lightning arresters	Westinghouse
Motors	Four Westinghouse No. 567-C-7, inside hung
Paint	Chicago Varnish
Sanders	Ohio Brass
Sash fixtures	O. M. Edwards
Seats	Hale-Kilburn
Seating material	Chase Fricze Plush, grade C
Slack adjuster	Westinghouse
Springs	Baldwin Locomotive Works
Step treads	Stanwood self-clearing
Trolley base	Westinghouse
Trolley shoes	Miller
Trucks	Baldwin
Ventilators	Railway Utility
Wheels	Steel, 36 in. A. R. A.
Special devices	One Westinghouse pantograph per car

Special rolling stock ordered includes two parlor-observation trailers with seating capacities of 21 and two dining car trailers seating 24 passengers. These units were ordered in December from the Pullman Company and are to be delivered in July. The specifications follow:

Length over all	64 ft. 0 in.
Truck wheelbase	11 ft. 0 in.
Width over all	9 ft. 9 1/2 in.
Body	Steel
Headlining	Steel
Roof	Arch
Air brakes	Westinghouse
Axles	Heat-treated
Car signal system	Faraday
Car trimmings	Bronze
Side bearings	Stucki
Control	Westinghouse
Couplers	Tomlinson MCB
Curtain fixtures	Railway Curtain Supply
Curtain material	Pantasote, silk lined

Hand brakes	Peacock
Heater equipment	Peter Smith and Railway Utility
Headlights	Electric Service Supplies
Journal bearings	Plain
Journal boxes	Symington
Paint	Chicago Varnish
Sash fixtures	O. M. Edwards
Seats	Pullman chairs
Seating material	Leather
Slack adjuster	Westinghouse
Step treads	Stanwood
Trucks	Commonwealth Steel Co., six-wheel
Ventilators	Railway Utility
Wheels	36-in. A.R.A.

Four locomotives are also being constructed for this road. Baldwin Locomotive Works is the builder and delivery is expected to be made on June 1. They were ordered Sept. 21, 1925. Specifications for these units are given here:

Weights:	
Body and trucks	102,379 lb.
Equipment	57,621 lb.
Total	160,000 lb.
Booster centers, length	18 ft. 4 in.
Length over all	39 ft. 4 in.
Truck wheelbase	8 ft. 8 in.
Width over all	10 ft. 7 in.
Height, rail to trolley base	12 ft. 1 1/2 in.
Body	Steel
Air brakes	Westinghouse
Axles	Standard Steel
Compressors	Two Westinghouse D3-F
Control	Westinghouse
Couplers	Tomlinson M.C.B.
Gears and pinions	Nuttall, grade B-P
Hand brakes	Peacock
Heater equipment	Railway Utility
Headlights	Electric Service Supplies
Journal boxes	Symington
Lightning arresters	Westinghouse
Motors, type and number	4 Westinghouse No. 3553
Motors	Inside hung
Sanders	Ohio Brass, Form 1
Springs	Baldwin
Trolley base	Westinghouse
Trolley wheels or shoes	Miller and Pantograph
Trucks	Baldwin
Wheels (type and size)	42-in. tired
Special devices, etc.	Sirocco blowers, fan for motor ventilation

New Merger in Rubber Field

Financial interests of the Hewitt Rubber Company, Buffalo, N. Y., and the Gutta Percha & Rubber Manufacturing Company, New York and Brooklyn, have recently been merged. At a reorganization meeting held in Buffalo, N. Y., F. E. Miller was elected president of the Gutta Percha & Rubber Manufacturing Company, John H. Kelly and Amadee Spadone were elected vice-presidents and W. J. Magee became secretary and treasurer. The reorganization is the first step in the removal of the company's plant, office and other facilities to Buffalo. The company will continue the manufacture of corded fabric tires and mechanical rubber goods. It is expected that the personnel of the two merged companies will remain unchanged.

Turbine Drive for Boiler Feed Pump

Numerous advantages in favor of the use of turbine-driven boiler feed pumps are shown in the report of the Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio. A year ago the company replaced two steam pumps with one General Electric 60-hp., style D-51, two-stage turbine-driven centrifugal pump. The total annual saving has been \$663, a return of 28.9 per cent on the investment. The pumps are now held as standby.

Although the new unit has 50 per

cent greater capacity than the two previous pumps, it occupies only one-fourth the floor space. Its water rate is approximately 20 per cent less than the water rates of the Duplex pumps. The turbine has required no repairs, whereas the pumps averaged \$235 a year for repairs and renewal of parts. Only one-fifth as much time is now required for attendance, and the oil consumption has been cut from one gallon a day to one-half gallon a month. The turbine operates with a minimum of noise and vibration.

Temporary Relief for Shortage of Equipment in Detroit

Detroit Department of Street Railways has been authorized by the City Council to rent from the Peoples Motor Coach Company, a subsidiary of the Detroit United Railway, ten single-deck 25-passenger motor coaches on a basis of 8 cents per coach-mile.

H. U. Wallace, general manager of the D.S.R., is quoted as recommending the rental of the coaches until such time as the department is in position to add to its own equipment. The department is having difficulty to give proper service on existing coach lines due to lack of sufficient equipment. A large number of the street cars still in operation by the D.S.R. that were taken over from the Detroit United Railway are reported to be in very poor condition, and this condition enhances the need for new equipment including both street cars and motor coaches.

Mack Sales to Traction Companies

Among recent sales of Mack buses to electric railways by the International Motor Company are the following:

Beaver Valley Motor Coach Company, New Brighton, Pa., one 25-passenger city type, for operation between Leetsdale, Ambridge and Beaver Falls. Zone fare system, 5-mile route, 10 cents per zone.

Savannah Electric & Power Company, Savannah, Ga., one 29-passenger city type, trolley substitution in Savannah. Fare, 7 cents.

Twinn City Motor Bus Company, St. Paul, Minn., seven 230-in. chassis, Eckland bodies, for operation between Minneapolis and St. Paul, a 12-mile route at a 25-cent fare.

Los Angeles Railway, Los Angeles, Cal., three 230-in. chassis, for operation at a 5-cent fare over a 3.06 mile route on Alvarado Street.

Yakima Valley Transportation Company, Yakima, Wash., a subsidiary of the Union Pacific Railroad, one 29-passenger city type, for operation on the Summit View line in place of trolley cars over a 3-mile route at a 10-cent fare.

Utah Light & Traction Company, Salt Lake City, Utah, one 29-passenger city type to operate as a feeder to trolley line over a 6-mile route between Sugar House and Mill Creek for a 10-cent fare.

Boston Elevated Railway, Boston, Mass., three 23-passenger city type, for operation on Boston and vicinity routes.

Rochester Railways Co-ordinated Bus Line, Rochester, N. Y., part of New York Railway System, one 25-passenger city type bus.

Cincinnati Gets 54 Buses

Cincinnati Street Railway is purchasing 29 Mack buses, equipped with Bender bodies; eighteen Six-Wheel chassis, with Kuhlman bodies, and seven Schacht chassis, the bodies for which have not been determined. Permits were issued on Feb. 18 for operation on all bus lines except route H.

Samuel M. Curwen Sees Enlarged Market for Transportation Vehicles

President of New Brill Corporation Outlines the Advantages of Recent Merger—Expresses Confidence and Optimism Relative to the Electric Railway Situation—Sees Dawn of New Era of Usefulness and Prosperity

AN INTERVIEW

By Charles Gordon

IT IS significant that the recent combination of Brill and American Car & Foundry resources comes at a time when the electric railway industry is just entering a new era; when concrete evidence is available of the opportunity for intensive development of facilities, and when interest in improved electric railway equipment is growing rapidly. The new Brill Corporation, which Samuel M. Curwen now heads as president, links enormous financial and manufacturing facilities for the construction of all forms of common carrier transportation—steam, electric and automotive vehicles for both highway and rail operation.

What are the advantages of this combination to the purchasers of electric railway cars and equipment?

How will it affect the design, manufacturing and sales organizations of the several companies controlled by the new Brill Corporation?

Are any changes contemplated in the character of work at the various Brill plants now building electric railway cars?

Does this consolidation indicate a belief that the electric railway field has arrived at a point where its recovery and expansion may be hastened by mustering to its service greatly expanded design, manufacturing and merchandising facilities?

OUTLINES PLANS OF COMPANY

Back of every great development is a strong personality. History itself is only a record of the lives of the men who made it. So, also, in following the development and expansion of great industrial enterprises, back of the physical framework and shell of the structure there is found a dominating personality which supplied the imagination, courage, will power and driving force to rear it and give it life. There the man is found.

The industry is naturally interested at this time in getting the viewpoint of Sam Curwen, as he is best known among his many close friends. Although busily engaged in clearing up the details connected with the present changes, he consented to outline the present plans of the companies now brought together and in addition expressed a view of the electric railway situation which in itself radiates confidence and optimism for the future.

To the purchasers of electric railway equipment, the advantages of the recent merger, while indirect only, are nevertheless of outstanding importance at



Samuel Curwen

this particular time, according to Mr. Curwen. The new Brill Corporation, control of whose common stock rests with the American Car & Foundry Company, is primarily a holding company, organized to take over the various subsidiary plants that are thus drawn together for greater co-ordination of effort. In this combination are included two groups of properties. One group consists of the J. G. Brill Company, with its subsidiaries—the G. C. Kuhlman Car Company, in Cleveland, the American Car Company, in St. Louis, the Wason Manufacturing

Company, in Springfield, Mass., and the Cie J. G. Brill in France. The second group consists of the new American Car & Foundry Motors Company, made up of the Hall-Scott Motors Corporation and the Fageol Motor Car Company of Ohio. By drawing together these large facilities for the production of both rail and highway transportation equipment, he pointed out, additional impetus will be given to the development of both forms of vehicles.

Mr. Curwen shed further light on the plans for the immediate future. These do not contemplate any material changes in the functions of the various plants. While the future may dictate the combination of the present automotive rail car and bus body products of the Philadelphia and Cleveland plants of the Brill Company with the other automotive activity of the American Car & Foundry Motors Company, no changes of this character are contemplated for the present. He indicated that the products of the Philadelphia plant, the Fageol Company of Ohio and the Kuhlman plant in Cleveland will continue to be offered to the trade.

The J. G. Brill Company, Mr. Curwen explained, will continue its long-established policy of building electric cars and their trucks for both domestic and export shipment. Through many years these products have become known and have built up a reputation throughout the world. The process of development and improvement will be continued. The extent to which this has been carried on in the past, he pointed out, is attested by the many patents granted the company covering devices developed by its engineers for improving the performance of cars and increasing the comfort afforded passengers. The seaboard location of the Philadelphia plant and the facilities for shipment of electric railway and self-propelled cars adapt it admirably for export business.

So far as present plans contemplate, the four present Brill plants are considered to be so situated in their respective territories as to avoid unnecessary heavy freight charges in the shipment of their products to electric railways in various parts of the country. It seems logical that this territorial arrangement will continue to be advantageous.

Mr. Curwen expressed the utmost confidence in the future of the electric railway industry. He declared that there is no intention of subordinating electric railway car development and

***R**APIDLY growing confidence in the electric railway situation and interest in the improvement of electric railway equipment give added significance to the recent merger of Brill and American Car & Foundry resources. This is the first of a series of interviews with car builders and other prominent manufacturers regarding the outlook for the industry.*

production to bus or self-propelled cars. Through the combination of interests represented, it is the intention to develop and cultivate intensively every form of public transportation on steam railroads, electric railways and highways.

BUSES TO PLAY IMPORTANT PART

Since the manufacture of buses looms as an important part of the new company's activities we passed to that subject. Mr. Curwen held that the extent to which the bus may in the future be applied as part of the transportation system of the country is as yet a matter for conjecture. He pointed out that the bus has been definitely proved to have an important part to play in feeder service and through districts where a de luxe service at higher fares than mass transportation agencies is desired. In new territories, where the character of future development is uncertain, the flexibility of the bus offers an opportunity of extending transportation service at minimum initial expense until such time as the volume of riding justifies the investment in rail and overhead line. Its more economical operation, and its apparent superiority of facilities for quick loading and unloading of passengers, makes the use of the street car imperative where the volume of riding approaches mass transportation conditions.

This answer was made to a question regarding the extent to which Mr. Curwen expected to see the bus play an active part in the future local transportation scheme of the country. But he went further. He pointed to increased parking congestion difficulties in large cities as a reason for a growing field for application of de luxe bus service at substantially higher fares than electric cars, and predicted that there would be a large increase in demand for such transportation agencies to replace the use of private automobiles for travel in the congested portions of large cities. There was little doubt in Mr. Curwen's mind of the future usefulness of the bus.

HAS INTIMATE KNOWLEDGE OF CAR DEVELOPMENT

Here the discussion centered more definitely on the electric railway car and the future of the industry itself. Mr. Curwen's knowledge of cars, trucks and equipment comes from detailed contact with their design, construction and operation. Prior to 1891, when he became a general salesman for the Brill Company under John A. Brill, he had worked his way through the drafting department to the position of chief draftsman. From the position of salesman he became assistant general manager and in 1903 was made general manager. In 1908, upon the death of John A. Brill, he became first vice-president, and in 1912 succeeded James Rawle to the presidency.

Not even after he was carrying heavy executive responsibilities did Mr. Curwen relinquish close contact with the improvement of the company's products. Careful study of the operating problems of the industry enabled him to foresee its requirements and resulted in the development of many of the valuable patents owned by the company.

With this background of experience to draw from, I sought his opinion on the status of car design and on the outlook for the electric railway industry.

"The car exhibits at the Atlantic City convention last fall to my mind showed that the electric car can be made as attractive as the automotive vehicle," he said. "It is necessary, however, in refining the electric car to bear in mind that its service is to the masses, and that while a part of the public would be willing to pay the higher rate of fare necessary to maintain such refinements, it is questionable whether passengers generally are not more interested in reaching their destinations with the quickest dispatch. While comfort is important, it is subordinated to the other functions of the electric car in handling large crowds quickly."

"What, in your opinion, is the outlook for electric railway car purchases during 1926?" I asked.

"From present indications the outlook is very promising and the large number of inquiries for new cars shows a tendency on the part of electric railways to recognize the advantages of up-to-date equipment. With the knowledge that it will be profitable to replace many of the obsolete cars now in service and with convenient financing facilities available, it is probable that electric railways will retire this year many of the cars which they know are costing them much more to operate in comparison with new equipment than the interest requirements on the investment in new cars."

How the operating managements in the industry can co-operate in bringing about improved design of cars and in lowering manufacturing costs seemed an important angle of the subject. In Mr. Curwen's opinion, precedent and purchasing methods have much to do with this question. He pointed out that it has been traditional in the industry to specialize in types of rolling stock to suit individual ideas of design. This, he explained, is not economical. Car builders are willing to build whatever the customer wants, provided the latter is prepared to pay the additional cost of special design and construction. He indicated that manufacturing costs would be lowered by more uniformity in design.

INTERURBANS HAVE IMPORTANT PLACE

Our discussion closed on the subject of the outlook for the interurban lines of the country. Mr. Curwen was optimistic in his view of their future usefulness, except of course in those instances where conditions did not warrant the construction of lines in the first place. He pointed to the examples of roads in which the application of light-weight and modern equipment by greatly decreasing the cost of operation has resulted in vast improvement of situations formerly held to be hopeless. He is convinced that the spread of this process to other properties will be followed by a period of renewed prosperity and usefulness for many interurban lines. He held that the ease of maintaining schedules and the comparatively high degree of safety of the interurban make it a transportation agency which, with proper facilities, has a valuable function and service to perform.

Rolling Stock

Cleveland Railway, Cleveland, Ohio, has before the Council for action a program of improvement totaling \$5,000,000 which calls, among other things, for the purchase of 100 new cars and a similar number of buses.

British Columbia Electric Railway, Vancouver, B. C., intends to order some new equipment. One authority states that the equipment will probably consist of four two-car trains and eight single cars.

Hydro Electric Railways, Toronto, Canada, is awaiting delivery of twelve cars for Windsor offered to the radial department of the Provincial Hydro Commission under \$10,000 each. The cars have been inspected and pronounced suitable for use in Windsor. Five new cars have also been ordered by the company and will be delivered in three or four weeks.

Municipal Railway, San Francisco, Cal., plans to purchase fifteen or twenty cars, at a cost of \$255,000 and \$340,000 respectively.

Union Traction Company of Indiana, Anderson, Ind., through Arthur W. Brady, receiver, has prepared a petition asking authority to purchase sixteen buses. The approximate cost will be \$135,000. The purchase will include eleven of the large type passenger buses that have been in use on the Hoosier Stage line. The five others are to be buses for use on city lines in Muncie and Anderson, Ind. The transaction has been sanctioned by the Indiana Public Service Commission and all that now remains to complete the deal is the sanction of the Circuit Court at Anderson.

New York Railways Corporation is contemplating the purchase of 25 additional buses for experimental purposes in the co-ordination of bus and trolley service. These buses will be single-deck units of the same general type as the sample bus which was designed by the company last summer and described in detail in *ELECTRIC RAILWAY JOURNAL* of Sept. 5. No franchise has been received for the regular operation of buses as yet, but the application has been filed for some time.

Track and Line

Binghamton Railway, Binghamton, N. Y., will construct an extension along Floral Avenue in Johnson City from Askley Avenue to Riverside Drive. The evidence showed that the village authorities, the residents of Floral Avenue and the company have agreed on the paving of the street and the extension of the trolley line under its franchises. The Public Service Commission has approved the extension.

Philadelphia Rapid Transit Company, Philadelphia, Pa., has submitted plans for laying a double track on Erie Avenue from Second Street to Torresdale Avenue and on Torresdale Avenue to Frankford Avenue. The track extension will provide a cross-city route for the accommodation of the public in the northeast section.



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Transmission Line and Special Crossing Structures, Catenary Bridges

WRITE FOR OUR NEW DESCRIPTIVE CATALOG

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Engineering and Management, Construction,
Financial Reports, Traffic Surveys
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825 Equitable Bldg.

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NEW YORK
49 Wall Street

THE P. EDWARD WISH SERVICE

50 Church St.
NEW YORK

Street Railway Inspection
DETECTIVES

131 State St.
BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

STUCKI SIDE BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.



KASS SAFETY TREADS

Lowest in Cost, Lightest in Weight,
Highest in Efficiency

MORTON MANUFACTURING CO.
CHICAGO

PAXSON Switch and Frog BROOMS

Wire or Rattan

J. W. PAXSON CO.
Philadelphia, Pa.



Adapted to all
Types of rails
and paving.



GODWIN Steel Paving Guards

Proven by service to economically prevent
seepage and disintegration of street railway
paving.

Write for Illustrated Catalog No. 20

W. S. GODWIN CO., Inc.
Race and McComas St., Baltimore, Md.

Save the motors use

Nuttall

Standard Helical Gears



That shock of acceleration that is inevitable with spur gearing. Springs bolts; strains bearings, loosens insulation, cuts gear life and motor life, and piles up maintenance.

The motors suffer; body work suffers and soon begins to creak.

Nuttall BP Helical Gears will stop this profit leak. The meshing of the teeth is like the turning of a screw — smooth, vibrationless, noiseless, shockless. There is no grinding and no chattering.

We'll be glad to cooperate in *proving* their economy on your cars. Consult us.

Write for our Helical Gear Book

R.D. NUTTALL COMPANY
PITTSBURGH  PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.





Better service and less trouble with Generals—says Interstate

Today, 75% of the tires used on their 14 Pierce-Arrow, Cadillac, Fageol and Studebaker busses are General Cords

The first General Cord bought by the Interstate Busses Corporation, of Springfield, Massachusetts, went into service less than one year ago. Careful mileage records were kept . . . tire costs noted to the fraction of a cent per mile.

For Interstate, remember, operates 14 big busses from Springfield to Putnam, Southbridge, Providence and other Massachusetts points—and a difference of a few cents per mile may easily mean the difference between profit and loss when the books are balanced at the end of the year.

Today 3 of every 4 tires bought by Interstate are General Cords. Company officials say they have had

less trouble with Generals than with any other tire. In actual service, Generals have yielded from 25,000 to 28,000 trouble-free miles, greatly reduced jolts and jars from ruts, bumps and holes in the road, and virtually eliminated the possibility of skidding.

The General Cord is the original low-pressure tire. It rides on less inflation—and with less internal wear. Its greater freedom from internal friction assures a tremendous yearly saving in power and gasoline consumption, and the lowest possible cost of operation.

And *that's* what every fleet operator wants!

The Mark
of Leading
Tire Stores
Everywhere



The

GENERAL CORD

—goes a long way to make friends

BUILT IN AKRON, OHIO, BY THE GENERAL TIRE AND RUBBER CO.



Sixty-one Fageol Safety Coaches In Florida's Largest Fleet

The Stone and Webster organization, with a background of motor coach operating experience covering a large part of the United States, has just finished taking delivery of forty-two Fageol Safety Coaches for the Jacksonville-Miami Bus Lines.

To operate in conjunction with this line, they have also acquired the Orange Belt Auto Line, connecting Orlando and Daytona, the back-bone of whose fleet consists of nineteen Fageol Safety Coaches.

This large order, following their numerous repeat orders over the past four years, is an eloquent testimonial of satisfactory service.

FAGEOL
SAFETY COACH

Territory West of the Rocky Mountains served by

Fageol Motors Company
Hollywood Blvd., at 107th Ave.,
Oakland, California

Territory East of the Rocky Mountains served by

The Fageol Company
(In the Akron District)
Kent, Ohio

Now—Many of the Nation's Great Bus Operators Are Using

Fisk Transportation "Fillerless" Cords

Today, only a few months after the announcement of the Fisk Transportation "Fillerless" Cord, many bus owners have already narrowed their equipment down to this remarkably economical tire.

Actual running has convinced these bus owners that the "Fillerless" Cord construction means very definite savings in operation costs and more comfortable and safer riding.

You, too, will be convinced if you will put one of your buses on Fisk Transportation "Fillerless" Cords and compare them with your other tires.

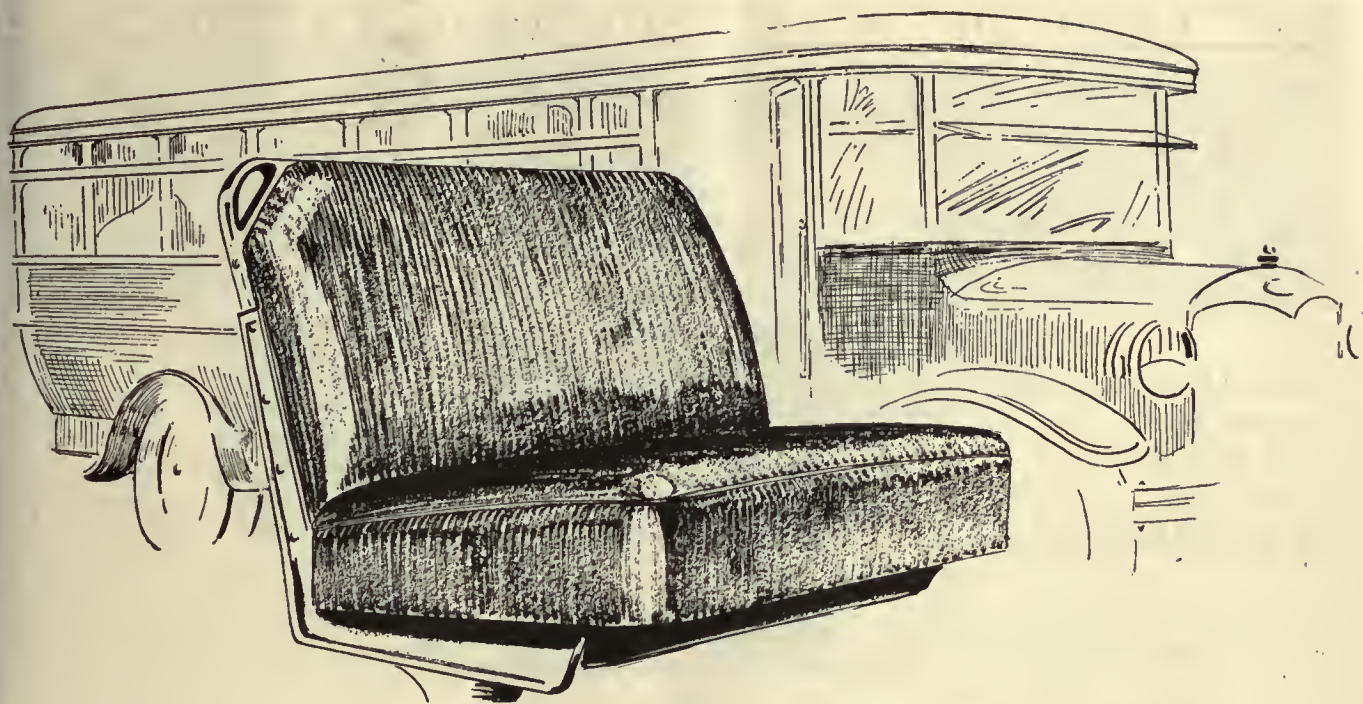
*147 Fisk Branches serve
Fisk dealers everywhere.*



Time to Re-tire
Get a FISK
TRADE MARK REG.
U. S. PAT. OFF.

NOTE:—The Fabric in the Fisk Transportation "Fillerless" Cord is called "Fillerless" because this method of construction eliminates cross threads (fillers), controls the spacing and tension of cords and uniformly surrounds the cords with rubber.

FISK TRANSPORTATION "Fillerless" CORDS



PANTASOTE—

*A bus seat and curtain specification
established through 30 years of
satisfactory railway service*

Maintenance records, in the files of practically every steam and electric railroad in the country, stand proof of Pantasote wearing qualities.

So, in choosing a material for bus seats and curtains—where every cent saved on maintenance is vital, and where every added feature of comfort and appearance becomes a needed fare-sales argument—Pantasote is the railwayman's most logical and most convenient choice.

As a seat covering, Pantasote offers an extremely wide range of the richest and most appropriate grains, in all the wanted colorings. It is admittedly far superior, both in appearance and wearing qualities, to any split leathers, retains its fresh new appearance long after lower grade materials have become worn and shabby, is always soft and pliable, and will not crack or deteriorate under any climatic conditions.

As a curtain material the absolutely fade-proof and weather-proof qualities of Pantasote make for exceptional service, with the economical maintenance of a high standard of appearances.

But remember, in buying, that only *genuine* Pantasote has these Pantasote qualities. It will pay you to be quite specific and to insist on getting just what you specify—*genuine Pantasote*.

*for bus Seats
for bus Curtains*

THE PANTASOTE COMPANY, INC.
250 Park Avenue, New York City

PANTASOTE

100 · YEARS · OF · MANUFACTURING · EXPERIENCE ·

Order Snow Sweeper
Rattan and
Car Seat Webbing
from your
H-W Warehouse.



H-W Car Seat Types Meet Modern Travel Demands

Present-day competition in passenger transportation demands greater passenger comfort. The seating equipment of old as well as new cars must be modernized.

From its 100 years of seat-building experience, Haywood-Wakefield has designed many new models of Electric Railway seats which meet all phases of this demand.

H-W car-seating engineers can render valuable assistance in the solving of your seating problems. Their counsel is available to you through any of our sales offices. The service is free, and you are urged to use it.

No. 8-C-5 Special, is an example of stationary seat construction now being adopted by electric traction companies. It has double spring seat construction. Spring edge back is of the special H-W recessed type, built for maximum knee room without sacrifice of comfort. Seat and back are pitched for easy posture.

No. 325-S. C. Special, is of the reversible type. It may be had with 22- or 25-inch back; also with head-roll and arm rests. Seats are double and backs single spring construction, giving all the comfort of a Pullman Coach. Finish and upholstery as ordered.



HEYWOOD-WAKEFIELD SALES OFFICES: .

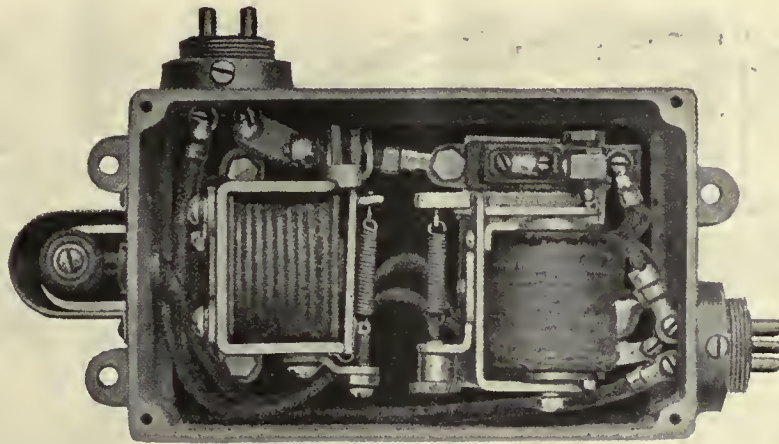
HEYWOOD-WAKEFIELD COMPANY
516 West 34th St., New York, N. Y.

HERBERT G. COOK
Hobart Bldg., San Francisco, Cal.

HEYWOOD-WAKEFIELD COMPANY
1359 Railway Exchange Bldg., Chicago, Ill.

THE G. F. COTTER SUPPLY CO.
Houston, Texas

THE RAILWAY & POWER ENGINEERING CORP.
Montreal, Toronto and Winnipeg, Canada



The Why and How of Voltage Regulation

Why do you need Leece-Neville Voltage Regulation on your buses? Because Leece-Neville Voltage Regulation is a scientifically designed and perfected 12-volt power plant which gives steady current for lighting, whether the bus is standing or running, and regardless of engine speed in operation. It charges the battery at an even and correctly proportioned rate. It cannot overcharge even though you drive from coast to coast. It will light your bus steadily, and at full candle power, direct from the generator, without risk of burn-

ing out the lamps. In short, it makes your bus electrical system as nearly perfect in operation, as nearly trouble-free, and as nearly fool-proof as human ingenuity can devise.

Voltage Regulation does this efficiently because every unit,—generator, magnetic switch, starting motor and Voltage Regulator,—is a specialized unit perfectly co-ordinated into a compact and well balanced system.

We will gladly mail our booklet, dealing with the subject in detail, on receipt of your postal card.

THE LEECE-NEVILLE COMPANY
CLEVELAND, OHIO





Not mere beauty but *enduring* beauty

It isn't very difficult to make a car look beautiful, but what determines the value of a finish to railway and bus service is its *enduring* beauty. A lasting finish of extreme beauty is provided with Egyptian Lacquer. It is easily applied in successive hourly with the spray gun.

Railway companies can well afford to invest in a *permanent* finish because, in the last analysis, the finest appearing buses and railway cars return the biggest revenues.

Our experience in 50 years of manufacturing lacquers exclusively is at your service. *Consult us.*

THE EGYPTIAN LACQUER MFG. CO.

90 West Street, NEW YORK

Chicago

Los Angeles

San Francisco

EGYPTIAN LACQUERS

HASKELITE

the superior plywood
—ideal for

1. Roofs
2. Ceiling
3. Linings
4. Seats
5. Card racks
6. Floors.

When You Rebuild a Car Why Not Modernize it with Haskelite and Plymetl?

Old cars that are too good to scrap can be greatly improved by inserting HASKELITE and PLYMETL



Modern Equipment Builds New Business

Progressive operators are overlooking no chances to increase revenue. They are adopting cars, buses, and commercial bodies best suited to local conditions. Illustrated above is one of the twenty-two new one-ton Ford trucks in door-to-door express service on the Illinois Traction System. The special bodies built by Kratzer Carriage Company, Des Moines, Iowa, have $\frac{1}{4}$ in. 3-ply HASKELITE roofs and $\frac{1}{8}$ inch double faced PLYMETL side panels. The body has no framework, the side panels being supported only at the four corners.

where needed. This practice, as followed by many leading companies today, cuts the weight thereby reducing operating costs; simplifies maintenance; and in many cases so improves the appearance and riding quality as to give the car many added years of profitable life. Our engineering data in blueprint form covers new construction and maintenance of street cars, buses and commercial bodies. A file of this data is yours for the asking.

HASKELITE MANUFACTURING CORP.

133 W. Washington St., Chicago, Ill.

PLYMETL

—the armored plywood. Unequalled for strength and light weight in side panels, vestibule linings, etc. for either old or new cars

PLYMETL

MODERN CARS for

F. G. Buffe, said:*

"Before we can make our service popular we must make it good. The comfort and convenience of passengers must come first—it has been proved in several cities that new, attractive equipment invites patronage and increases receipts."

*Wichita, Kansas, Nov. 30, 1925

The Birthplace of the Safety Car

St. Louis Car Company
 INTERURBAN AND CITY PASSENGER CARS AND TRUCKS
 SELF PROPELLED RAILCARS - BUSES
 STEAM RAILROAD COACHES AND FREIGHT CARS
 SEATS, CURTAINS, FURNISHINGS AND GENERAL RAILWAY SUPPLIES
 BRIDGE, GRAB, GRAY IRON AND MALLEABLE CASTING
 STEEL FURNISHINGS

Cable address
 "Car"

St. Louis, Mo. Feb. 13, 1926

*This is the fourth of a series
 of advertisements devoted to
 Modern Cars.*

TO THE ELECTRIC RAILWAY INDUSTRY:-

Surely every electric transportation executive will heartily agree with this expression of Mr. Buffe.

Instances are being brought to our attention continually of modernized railroads that have enjoyed increased patronage and lowered operating costs. These cases are of long enough standing to make actual figures available. In fact it is now thoroughly established that new cars should not longer be considered an expense, for they may be reasonably expected to pay for themselves within a few years.

The St. Louis Car Company has had the privilege of contributing both equipment and Car Trust finance accommodations to the modernization programs of a number of railroads. We are in a position to work with you likewise. Accord us the opportunity.

Respectfully yours,

Edwin Shesser
 President & General Manager

EW/D

Modern Conditions—

Quality Cars

When placing orders for additional cars — improve your service by installing St. Louis Car Co. QUALITY Cars with such distinctive features as noise reduction, easy-riding upholstered seats and improved lighting facilities.

Actual tests with new modern type cars have shown increased business!

Further particulars furnished on request



New cars recently delivered to

SAN ANTONIO PUBLIC SERVICE CO.

SAN ANTONIO, TEXAS

by

St. Louis Car Company

St. Louis, Mo.

"The Birthplace of the Safety Car"





One hundred new surface cars recently put into service by the Philadelphia Rapid Transit Company are equipped with "STANDARD" Rolled Steel Wheels.



Rolled Steel Wheels
Quenched and Tempered
Carbon Steel Axles
Coil and Elliptic Springs

STANDARD STEEL

WORKS COMPANY
PHILADELPHIA, PA.

BRANCH OFFICES:

Chicago	Portland, Ore.	St. Paul, Minn.
St. Louis	Richmond, Va.	Pittsburg, Pa.
New York	San Francisco	Los Angeles, Cal.
Houston, Texas	Boston	Mexico City, Mex.

WORKS: BURNHAM, PA.

Proved!

By more than a million car miles

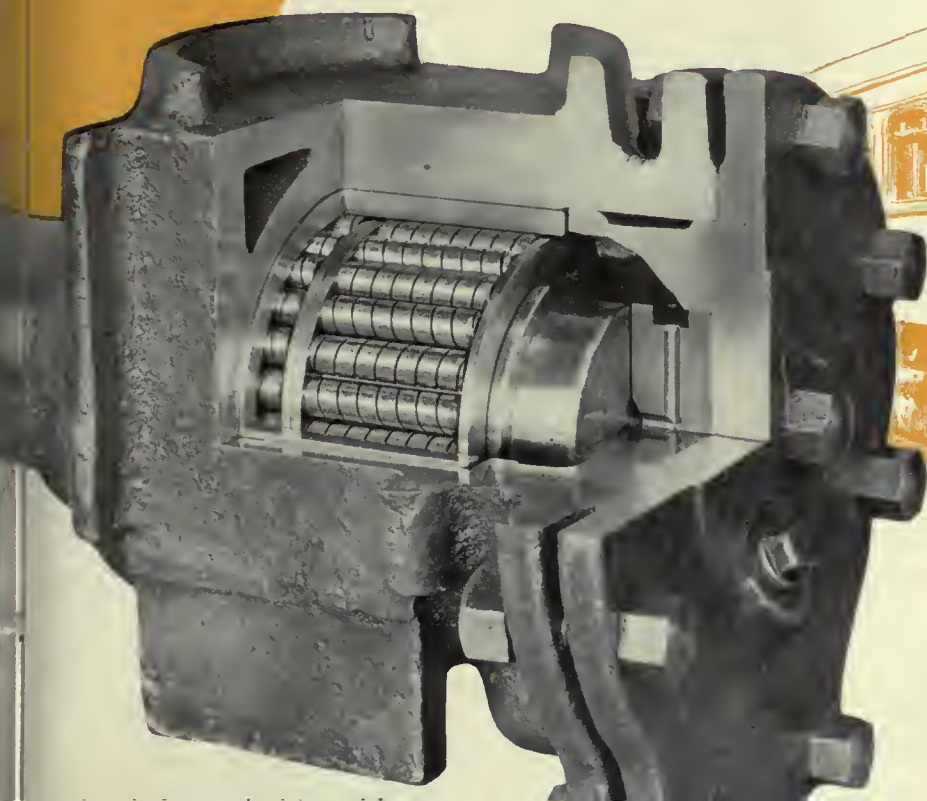
Hyatt equipped cars have accumulated 1,209,500 low cost dependable—quiet miles on 22 different properties.

Individual cars are nearing the 150,000 mile mark without showing the least sign of journal bearing wear, and without requiring repairs, replacement or adjustment of any kind on the Hyatt equipment.

Records for maintenance economy—rigid adherence to schedule—and freedom from trouble—on light-weight city cars and heavy interurban express trains, together with names of roads are available for inspection.

Performance of this kind—in constant year-round service successfully meeting every railroad requirement—is assurance that Hyatt Roller Bearings in the journals of your cars will return profitable miles.

Hyatt Roller Bearings meet every A.E.R.A. requirement. They carry full standard loads in boxes which fit all standard trucks without change.

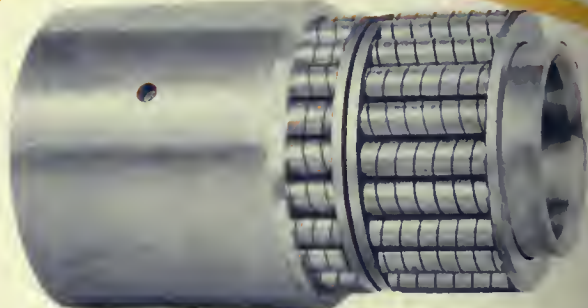


HYATT
Quiet
ROLLER BEARING

The Universal Use of Hyatt Roller Bearings

In Every Branch of Industry

*Electric Railways
Steam Railways
Steel Mills
Textile Mills
Motor Vehicles
Material Handling
Equipment
Agricultural
Equipment
Mine Cars
Power Transmission
Lumbering
Equipment*



During the past third century the use of Hyatt Roller Bearings has gradually extended into every corner of the globe and they are now accepted as standard in many types of manufacturing equipment and products.

Engineers trained in the industries served by Hyatt—together with extensive laboratory equipment—are at the disposal of customers for solving their individual bearing problems. Pertinent data on every initial Hyatt installation is considered before a recommendation is made.

That this deliberate practice has borne fruit is reflected in the forward strides made by pioneer anti-friction bearing users among manufacturers of tractors—automobiles—mine cars and industrial trucks.

An organization that has made anti-friction bearings a practical standard for efficiency in so many modernized units of transportation, agricultural and manufacturing equipment, naturally supplies a product of equal integrity for electric railway cars.



HYATT ROLLER BEARING CO., NEWARK, N. J.
(Division of General Motors Corporation)



Cars built for the Chicago Surface Lines

Light Weight Cars

all types—city or interurban service

Single or
Double Trucks
Snow Sweepers

GAS-ELECTRIC
MOTOR
COACHES

MOTOR
COACH
BODIES

Keeping in close touch with every development and new demand in transportation, Cummings Car and Coach Company are eminently fitted to build all types of rolling stock to meet present-day needs. A modern plant and highly skilled workmen are important factors in the production ability of Cummings Car and Coach Company.

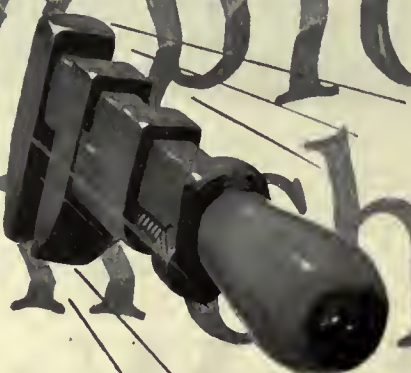
Our engineering department will gladly co-operate with transportation companies, planning new equipment and furnishing estimates, or we will submit proposals on specifications furnished.

CUMMINGS CAR AND COACH CO.

Successors to McGuire-Cummings Manufacturing Co.

GENERAL OFFICES: 111 West Monroe Street
CHICAGO, ILLINOIS

Waste!- World's Champion Wrench Thrower



WASTE throws wicked wrenches, in the form of excess friction, needless wear and misalignment. Put your machinery out of range with Timken Tapered Roller Bearings.

Timkens supplant sliding motion in the bearings with steel-to-steel rolling motion. The elimination of Power Waste alone may save you as much as 30%! And far less lubricant is needed.

Timkens also give machinery the high load capacity inherent in Timken Tapered design, absorbing thrust scientifically, withstanding shock and permitting compact, simple mountings.

Timkens alone have positive roll alignment to carry speed. Timkens alone are made of special Timken

electric furnace alloy, as fine for its purpose as any steel in finest machinery.

Timken Bearings enter into the manufacture and purchase of so much modern mechanical equipment on the strength of proven savings. Some 150,000,000 Timken Bearings already are applied throughout manufacture, construction, mining, agriculture and transportation. Surely, Timkens are of immediate interest to you, whether you build or buy machinery.

Authentic Timken data on your business are available upon request. The universal technical experience of the largest bearing industry is ready to guide you to far-reaching improvements and economies in your working equipment and in your output.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

TIMKEN *Tapered Roller* BEARINGS



NO EXTRA PAY

Davis "One Wear" Steel Wheels are paid for once—when they are bought.

After other wheels are paid for, comes the recurring costs of maintenance.

DAVIS "ONE WEAR" STEEL WHEELS

shun the shop. They are worth more than other wheels because they involve no maintenance expense.

AMERICAN STEEL FOUNDRIES

NEW YORK

CHICAGO

ST. LOUIS

DAVIS WHEELS ARE SAFER WHEELS

Cater to a 1926 Public with 1926 Equipment

Edwards Metal Sash

—a major detail in street
car construction.



*Car for Scranton Street Rail-
way, built by Osgood Bradley
Car Company. Equipped
with Edwards Metal Sash.*



“**A**TENTION must be paid to noise reduction.” Such was one of the statements made by F. G. Buffe, of the Kansas City Railways, in a recent address, in which he emphasized the fact that street railways must cater to today's public with modern equipment—that there are 25,000 obsolete street cars in service today which must be replaced.

Edwards Metal Sash fits in with all these modern ideas. It is true 1926 equipment.

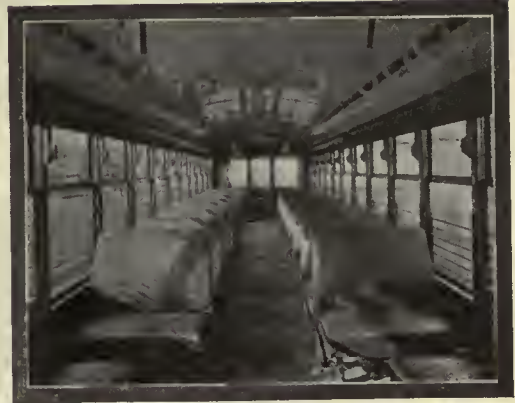
It makes windows noiseless under any and all conditions! What annoys passengers more than a series of rattling windows?

Edwards Metal Sash makes windows air-tight in the coldest of weather. And yet the windows are easily opened! Edwards Metal Sash makes comfortable passengers, winter and summer.

Edwards Metal Sash gives a maximum of glass area. The sash is narrow, and because no lock racks are needed the posts too may be narrow. Here's plenty of daylight and ample vision for the passengers, and neat, trim windows with not even a dirt pocket to impede cleaning.

Edwards Metal Sash requires practically no upkeep. Its fine brass withstands time and weather, its construction withstands constant use. Edwards Metal Sash decreases maintenance costs and increases patronage.

Now used by a number of car builders, it can be installed to specification by any builder. Edwards Metal Sash makes better cars!



Interior of Scranton car built by Osgood Bradley Car Company. A maximum of glass area!

Write us for details, which we will give without any obligation on your part.

O. M. EDWARDS CO.
SYRACUSE, N.Y.

Canadian Representatives: LYMAN TUBE AND SUPPLY CO., Montreal and Toronto



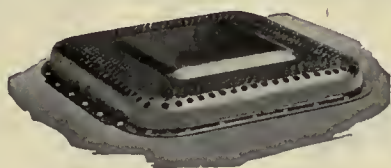
*For the modern car—a truly
modern current collector
with five specific points of
superiority*

1. LESS WIRE WEAR, because less trolley tension is needed for absolutely safe operation. Full 3-inch contact surface of Miller Trolley Shoes "hugs" the wire as no wheel ever could. This in itself is vitally important with increased operating speeds.
2. LESS SHOE WEAR, because Miller Trolley Shoes have no bearings to wear out and few moving parts.
3. NO LUBRICATION, because there are no rotating parts to Miller Trolley Shoes. Unnecessary work and "shopping" time is thus eliminated.
4. NO ARCING. Arcing is a devastating waste. It is eliminated only with sliding contact.
5. AMPLE CURRENT CAPACITY, even for the fastest and heaviest modern cars, saves motors, ensures steady lighting.

*Make a trial under your own operating conditions.
We will gladly co-operate.*

Miller Trolley Shoe Company

295 Columbia Road, Boston 21, Mass.



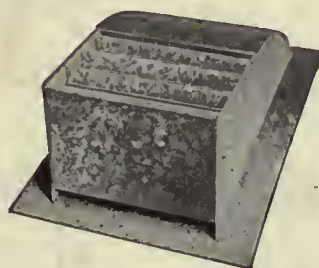
The "Aerating" for Buses



Type "C" for Street Cars



The "Dual" for Buses



Type "A" for Street Cars

A Rare Combination

IT IS one thing to design a ventilator that will ventilate thoroughly. It is another to secure a pleasing appearance without a sacrifice in performance.

N-L Street Car and Bus Ventilators meet all requirements and are surprisingly low in price as well. Without doubt, those are the reasons they're so universally specified, by operators as well as body builders.



*The Mark of a
Better Ventilator*

THE NICHOLS-LINTERN CO.

7960 LORAIN AVENUE

CLEVELAND, OHIO

Represented in Canada by: Railway & Power Engr. Corp., Toronto, Ont.
In Great Britain by United Automobile Services, Ltd., Lowestoft, England.
In Australia, South Africa and Orient by: Nolan Smith & Co., Ltd., New York City.

Over 70 per cent
placed repeat orders
which proves
that "Tool Steel"
gear & pinions are
best by test

read the story


10 years ago our company gave free of charge 58 "Tool Steel" pinions to 58 different electric railway companies, who had not before used our product. They agreed to keep track of the pinions and report to us at intervals as to how they were performing.

After a lapse of 10 years we have checked up and find of the 58 companies, 41 have placed repeat orders with us and have bought a total of 607 gears and 1814 pinions as the result of the test they ran. 17 companies either failed to follow their records or did not place repeat orders. Of these 17—eight are not operating at the present time.

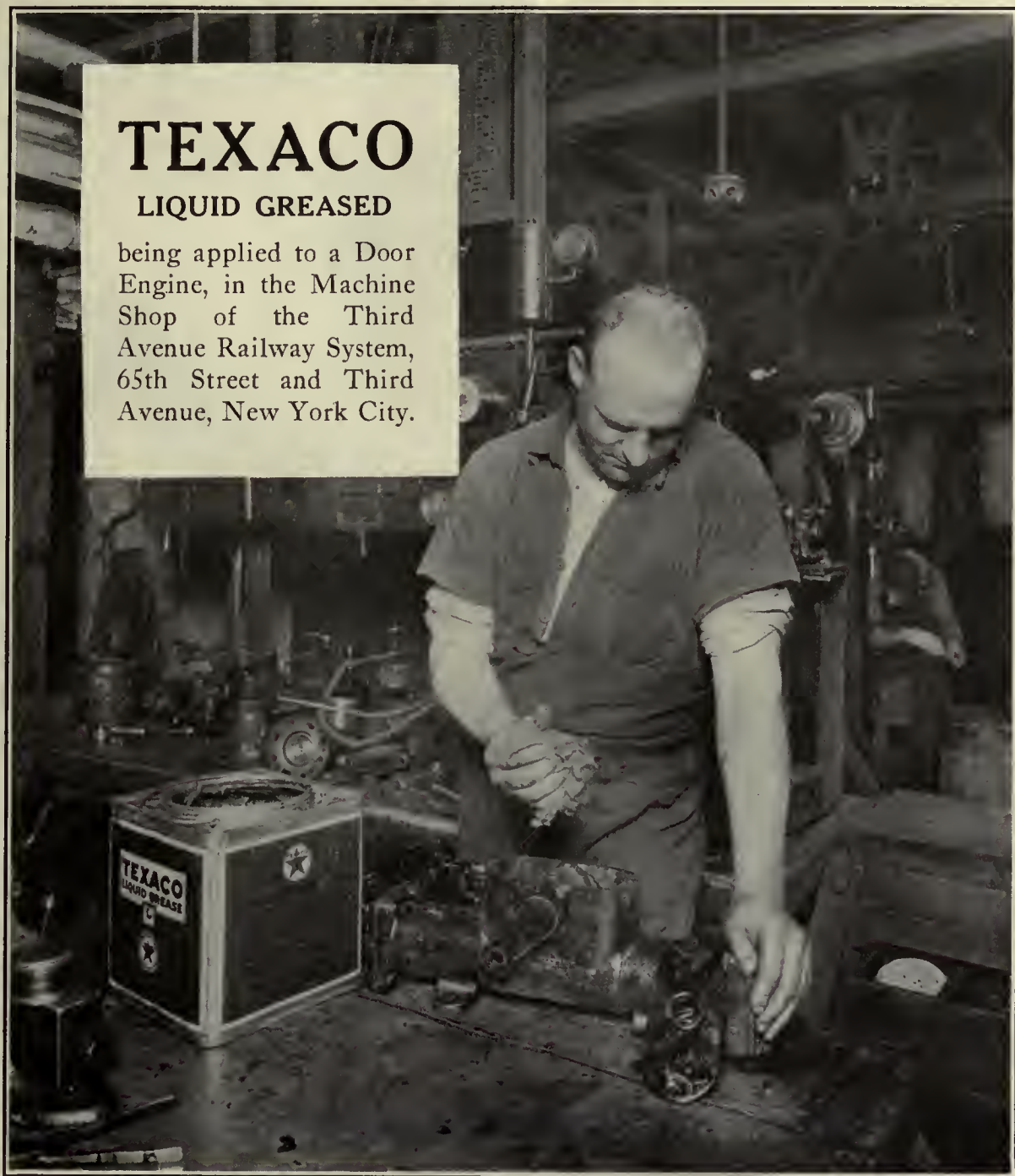
Tool Steel Quality T.S.Q. Tool Steel Quality

The Tool Steel Gear and Pinion Co.
Cincinnati, Ohio

TEXACO

LIQUID GREASED

being applied to a Door Engine, in the Machine Shop of the Third Avenue Railway System, 65th Street and Third Avenue, New York City.



TEXACO



The Chosen Lubricant
of ELECTRIC RAILWAYS





*You can ALWAYS depend on
EMPIRE BOLTS & NUTS*

RUSSELL BURDSALL & WARD
BOLT & NUT COMPANY
 PORT CHESTER, N.Y.

Branch Office:
 Seratus Building
CHICAGO

Branch Office:
 General Motors Bldg.
DETROIT

Branch
 Factory:
ROCK FALLS, Ill.

Strimple & Collette
 160 Jackson Street
SEATTLE

Maydwell & Hartzell, Inc.
 153-168 Eleventh Street
SAN FRANCISCO

Makers of Bolts, Nuts and Rivers Since 1843



From the First

THE average man—even the average trained operating engineer—does not realize the harm that may be done to machinery by even the occasional use of a poor lubricant. When a piece of machinery is run for a short time with a lubricant which does not provide an unbroken film of oil between the bearing surfaces, these surfaces become slightly roughened. However slight this roughness may be, it tends to break the protective film of lubricant, even when the correct grades of oil or grease are used.

The only way to make sure of getting full power and service from any piece of machinery is to prevent this first slight abrasion of the bearing surfaces by using the right grades of lubricants from the time the machine is put into operation. Whenever you install a new machine, get the advice of a competent lubricating engineer as to the grades of oils and greases to use, and provide a supply of these lubricants before permitting the machine to be used.

Standard Oils and Greases

are made in grades which cover the lubrication requirements of all machines in use in the industrial world. The lubricating engineers of the Standard Oil Company (Indiana) will be glad to make a survey of your plant and recommend the grades that are suited to your machinery.

No charge is made for this service. To make arrangements for such a survey, phone or write our nearest branch.

STANDARD OIL COMPANY

(Indiana)

General Offices: 910 S. Michigan Avenue

Chicago, Illinois





Collier Service

A nation-wide
organization
building and
sustaining car
card advertising
space values



Barron G. Collier, Inc.

Candler Bldg.
New York

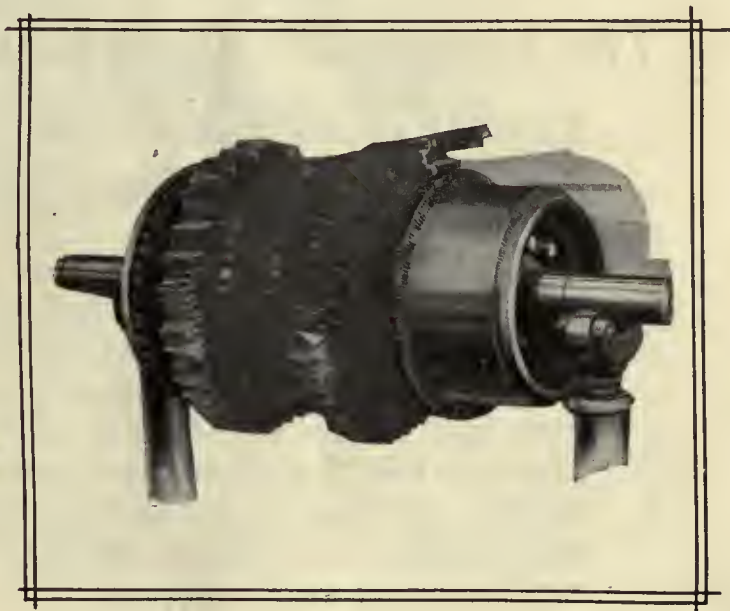
COLUMBIA

A service of conservation and construction for the electric railways



COLUMBIA

Door and Step Mechanisms
Air Brake Handles
(brass and malleable iron)
Controller Handles
(All types operating and reversing)
Signal Bells
Door Trucks and Sheaves
Pistons Gongs
Controller Parts and Handles
Trolley Wheels, Poles and Harps
Destination Signs (Steel)
"Navasplit" Headlining
Grid Resistors
Armatures and Armature Parts
Commutators (all types)
Field Coils
Brush-holders and
Brush-holder Springs
Truck Parts
Brake Rigging Forgings, etc.
Bearings (Axle and Armature)
Castings in Aluminum; Brass;
Bronze; Cast Steel; Gray Iron;
Malleable Iron; White Metal
and Zinc
Brake, Door and other Handles
Car Trimmings
Forgings of all kinds
Gear Cases
(steel or malleable iron)
Third-rail Shoe Beams and
Accessories
Babbitting Molds
Bending and Heading Machines
Car Hoists and Replacers
Coil Taping Machines for
Armature Leads
Coil Winding Machines
Pinion Pullers
Pit Jacks
Signal or Target Switches
Tension Stands



Motor Parts

Use the Columbia Shops as you would use your own shops. Columbia Service can meet your needs most promptly and most economically because Columbia has the equipment and organization to handle special or regular work on a manufacturing production basis.

Motor Parts for instance! During 35 years of active experience in electric railway maintenance work Columbia has accumulated a wealth of experience and a practical knowledge of all working requirements which have resulted in the development of many Columbia Specialties embodying the best features of all present standards of practice. The many hundreds of special and standard patterns, jigs, and fixtures in our stockrooms frequently enable us to save our customers considerable expense in the making of special parts.

Make Columbia part of your own facilities.

COLUMBIA MACHINE WORKS
and Malleable Iron Company
3303 Atlantic Avenue, Brooklyn, N. Y.

ANNUAL MAINTENANCE NUMBER

March 20, 1926

The time—the place—and the goal!

IN THE earliest stages of spring—when interest in the new car movement is at its height—this is indeed an opportune *time* for a special message to the electric-railway field.

The advertising pages of the Annual Maintenance Number of ELECTRIC RAILWAY JOURNAL afford the most effective display space in which to *place* such a message. They reach the railway officials who buy, and those whose opinions influence buying. They are supplemented by editorial pages and articles concerning modern maintenance methods for every department.

Thorough modernization of rolling stock, rehabilitation of track and special-work together with up-to-date machinery for maintenance, is the *goal* at which the railway field is aiming. If you tie-in the copy appeal with this theme, your message will be most effective.

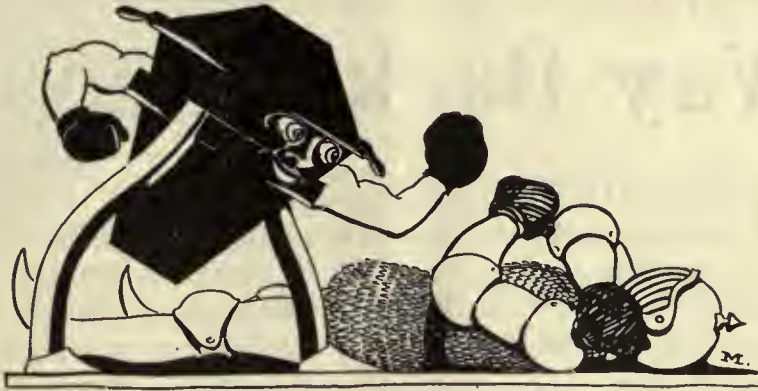
Our Advertising Service Department will be pleased to offer copy suggestions in line with present tendencies in the field. No obligation or charge involved.

ELECTRIC RAILWAY JOURNAL

(A McGraw-Hill publication)

Tenth Avenue at 36th Street
New York, N. Y.

Member ABP



K.O. for rail joint troubles

Joint troubles have increased in proportion to the growth of traffic until they have assumed heavy-weight proportions. They have increased in persistence until they have become a logical contender for the world's championship in annoyance value. They have encased themselves in the armor of old-fashioned prejudice which re-

sists progressive ideas until the last.

The time has come to recognize that joint troubles can be overcome, but not by half-way measures or trifling improvements in rail joint practice. Administer the final knock-out once and for all, by Thermit Welding, which completely eliminates the joints.

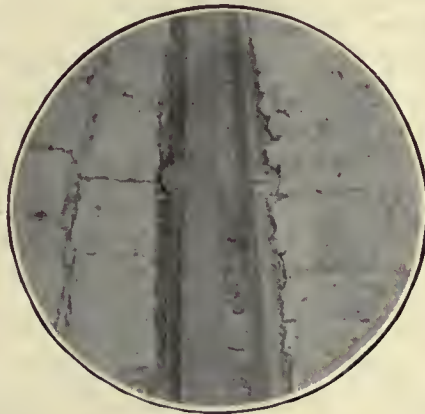


Illustration shows smooth unbroken rail, where once there was a "joint." Thermit Welding makes continuous rail out of standard lengths.



METAL & THERMIT CORPORATION

120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH

CHICAGO

BOSTON

SOUTH SAN FRANCISCO

TORONTO

Can You Remember 'Way Back When ...

A MERCHANT bought space in "the paper" because his friend Bill Smith was the publisher, and Bill said his paper was read by "nine out of every ten families in town"? Purely a friendly transaction with no thought of whether Bill's statement was open to question or his judgment in error.

Today the merchant wants to *know* what returns the publication will give as an advertising medium. Competition has forced him to buy space as he buys potatoes or sugar—not because the seller is a friend of his, but because he knows he will get the full quantity that is paid for, and that the expenditure will bring profitable results.

In other words, selecting mediums for advertising has passed from a haphazard procedure to an accurate scientific process. This has been brought about through A. B. C. reports.

The *Audit Bureau of Circulations* was organized eleven years ago to provide verified circulation data for the use of advertisers. It now has a large force of auditors who cover the United States and Canada once a year auditing the circulation reports of over 1400 publisher members.

A. B. C. reports containing full data on all circulation questions furnish the only means by which the advertiser can be positive that his advertising is reaching the prospective buyers he desires.

*The ELECTRIC RAILWAY JOURNAL is
a member of the A. B. C. The latest
report will be furnished on request.*

Electric Railway Journal

36th Street at Tenth Avenue
New York, N. Y.

ELECTRIC RAILWAY ENGINEERING PRACTICE

advances

—and naturally you wish
to keep abreast of the field

Just Out!

A complete picture of today's practice in electric railway engineering—the results of new research and developments—the lines along which further progress will travel—all now ready for you in the

New third (1926) edition of
Harding's

Electric Railway Engineering

By C. FRANCIS HARDING, Professor of Electrical Engineering; Director, Electrical Laboratories, Purdue University; Assisted by DRESSEL D. EWING, Professor of Electric Railway Engineering, Purdue University.

New Third Edition. 480 pages, 6 x 9, 248 illustrations, \$5.00.

This standard work, in its new third edition, gives an up-to-date picture of the theory and practice of electric railway engineering. It covers the principles and applications of train operation, power generation and distribution, equipment and types of systems.

All of the chapters involving applications, engineering practice or the results of new research or developments have been completely revised, augmented and illustrated with recent photographs and drawings.

New developments—new problems—new trends—new research

A new chapter has been added to introduce some of the economic problems involved in motor-bus transportation. The developments in automatic sub-stations and the results of braking tests on interurban cars are also included.

Following the trend of the times, the chapter on "Power Station Location and Design" gives way to that entitled "Sources of Electrical Energy" which contains in detail one of the most recent and complete contracts for electrical energy ever negotiated.

Read these chapter headings

Part I.—PRINCIPLES OF TRAIN OPERATION. I.—History of Electric Traction. II.—Traffic Studies (Pre-determined). III.—Traffic Studies (Existing). IV.—Train Schedules. V.—Motor Characteristics. VI.—Speed-time Curves (Components). VII.—Speed-time Curves (Theory). VIII.—Distance, Current, and Power-time Curves (Theory). IX.—Speed-distance, Current, and Power Curves (Concrete Examples). X.—Speed-time Curves (Straight-line). XI.—Locomotive Train Haulage. Part II.—POWER GENERATION AND DISTRIBUTION. XII.—Substation and Power-station Load Curves. XIII.—Distribution System. XIV.—Substation Location and Design. XV.—Transmission System. XVI.—Sources of Electrical Energy. XVII.—Bonds and Bonding. XVIII.—Electrolysis. Part III.—EQUIPMENT. XIX.—Signals and Dispatching Systems. XX.—Track Layout and Construction. XXI.—Cars. XXII.—Motor Busses. XXIII.—Motors. XXIV.—Control Systems. XXV.—Brakes. XXVI.—Car-house Design. XXVII.—Electric Locomotives. XXVIII.—Electrification Systems. XXIX.—Electric Traction on Trunk Lines.

Examine the book yourself—FREE

Let us send you a copy of the New Harding for ten days' free examination. No obligation to purchase—no agents—no red tape. You merely agree to return the book, postpaid, in ten days or to remit for it then. We believe you will want to keep a copy handy for reference. We know you will want to see a copy. Mail the coupon and a copy will be placed on your desk promptly.

McGraw-Hill Book Co., Inc.,
370 Seventh Ave., New York.

Send me for ten days' free examination, Harding's **ELECTRIC RAILWAY ENGINEERING**, New 1926 Edition, \$5.00.

I agree to remit for the book or to return it, postpaid, within ten days of receipt.

Name

Address

Position

Company E. 2-20-26

Clip and mail this coupon now

McGraw-Hill
FREE EXAMINATION COUPON



Metallic Shell Feed Wire Insulators

When inspecting the feeders, look to the insulators also. We can ship you practically any quantity and size of Feed Wire Insulators, with malleable iron or bronze shells or all moulded insulation. And remember it is the insulation that has stood the test for over thirty years.

This broad experience and knowledge in the manufacture and design of insulators as well as line material is worth your while considering, when placing your next order.

and here are the pins

Didn't you know we made the pins? We do, and sell them too, in all sizes. Nothing special about forged steel pins, but when you can drop them snugly in the hole, tighten them up good and screw the insulators on easily and securely, you'll want Anderson's all the time like the other fellows who won't use any but Anderson's.

Send for quotations.



Albert & J. M. Anderson Manufacturing Co.

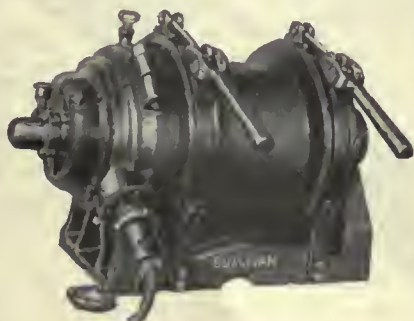
289-305 A St., Boston, Mass.

New York—135 Broadway
Philadelphia—429 Real Estate Trust Bldg.

London, E. C. 2, 12 Moor Lane
Chicago—105 S. Dearborn St.

You Can Hoist or Haul Quicker with Sullivan Portable Hoists

"Drilled the Holes—Then Set the Poles." That's what this Sullivan Turbinair (Compressed Air) Hoist did for the Chicago, North Shore and Milwaukee Electric Railway Co. when they had a lot of new transmission line towers to set. The hoist supported the drilling tool, lowering as it dug. Then it handled the structural steel uprights. Both jobs set a new standard for speed, handiness and labor economy.



Sullivan Electric Hoist,
Single Drum

Sullivan Portable Hoists are available in single or double-drum types, with Electric or Air Motors. Only 6½ hp., but they'll lift a ton vertically or haul a 100,000-lb. car on level track.

There are dozens of little hoisting or hauling jobs where a "Sullivan Portable" will save you money.

Ask for Bulletin 3276-E

SULLIVAN MACHINERY COMPANY

150 So. Michigan Ave., Chicago

Branches in All Principal Cities

Your Strong Box

Tucked away in *your* Strong Box are certain investments over which you feel justly proud. You exercised considerable care in their selection, because you believed in their dividend-paying abilities.

The Johnson J Box is a Strong Box in the same sense of the word, a dividend payer, a profit maker, a loss saver—watching your receipts faithfully, and unfailingly registering every fare so that you have a true and accurate record of all fares paid.

Working unceasingly to earn dividends by recording every penny received, you can feel sure that *this* Strong Box offers the same degree of security to your *stockholders'* investment, that *your* Strong Box offers yours.

JOHNSON FARE BOX CO.

CHICAGO, ILL.
4619 Ravenswood Ave.

NEW-YORK, N.Y.
980 Eighth Avenue



Instantaneous Registration by the Passenger

ROOKE of fare collection—SYSTEM

Meets every condition for all types of cars and buses. The stand device, as shown, adapts it to one-man uses—making register portable or stationary, at option. Handles nickels, dimes, quarters, or metal tickets, in any combination, FLEXIBILITY with CERTAINTY.



Rooke Automatic Register Company Providence, R. I.

Coin Counting and Sorting Machines

FARE BOXES

Lever-Operated and Slip Change Carriers

The Cleveland Fare Box Co.

Cleveland, Ohio

Canadian Cleveland Fare Box Co., Ltd., Preston, Ont.

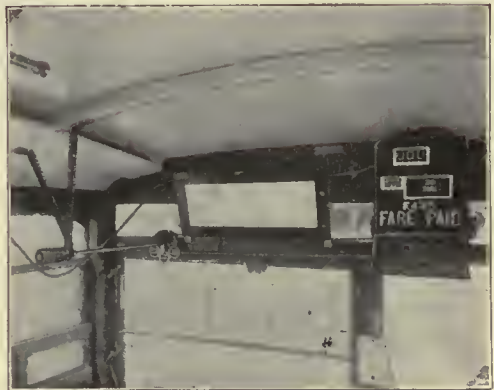


Gets Every Fare

PERY TURNSTILES or PASSIMETERS

Use them in your Prepayment Areas and Street Cars

Pery Manufacturing Co., Inc.
101 Park Avenue, New York City



OHMER
REG U S PAT OFF

Whether you operate cars or buses or both, you will receive the utmost in fare protection as well as the co-operation of both the public and the men who most closely represent you with the public.

Manufacturers of Ohmer Fare Registers, Ohmer Taximeters, Atco Taximeters, Ohmer Recordographs, Ohmer Hubodometers, Ohmer Odometers, Ohmer Truck Auditors, Ohmer Fare Boxes.

*Write for prices and complete details
Address Dept. A*

OHMER FARE REGISTER CO.
DAYTON, OHIO, U. S. A.

**ERASE "BRUSH TROUBLE"
FROM YOUR LIST
OF WORRIES**



with **BRUSHES**

Winter with its snow and sleet brings troubles and worries that cannot be foretold or prevented. You can however, prevent brush trouble by equipping your car motors and compressors with brushes that have been built especially for that service and that you know will operate perfectly even under the most trying conditions.



Brushes *fill the bill*

If it's long life, freedom from chipping and sparking, and smooth uninterrupted service that you want, be sure and specify USG Brushes on your next requisition.

Write for complete particulars

The United States Graphite Co.
Saginaw, Michigan

New York
Chicago

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Pittsburgh
San Francisco



Drip Points for Added Efficiency

They prevent creeping moisture and quickly drain the petticoat in wet weather, keeping the inner area dry.

The Above Insulator—No. 72—Voltages—Test—Dry 64,000
Wet 31,400, Line 10,000.

Our engineers are always ready to help you on your glass insulator problem. Write for catalog.

Hemingray Glass Company
Muncie, Ind.

Est. 1848—Inc. 1870

**PERFECT
MICANITE
INSULATOR**
Reg. U. S. Pat. Off.

ELECTRICAL INSULATION

Micanite armature and commutator insulation, commutator segments and rings, plate, tubes, etc., Empire oiled insulating materials; Linotape; Kablak; Mico; and other products—for the electrical insulating requirements of the railway.

Catalogs will gladly be furnished

MICA INSULATOR COMPANY

Sole Manufacturers of Micanite

Established 1893

66 Church St., New York

542 So. Dearborn St., Chicago

Works: Schenectady, N. Y.

8-3



Complete satisfaction

Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

No-wear Check Pawl
Free-Winding Tension Spring
Ratchet Wind
Emergency Release
Perfect Automatic Lubrication

Earll Catchers and Retrievers
C. I. EARLL, York, Pa.

Canadian Agents:
Railway & Power Engineering Corp., Ltd., Toronto, Ont.
In All Other Foreign Countries:
International General Electric Co., Schenectady, N. Y.

You're having brush trouble

CORRECT IT

USE LE CARBONE CARBON BRUSHES

They talk for themselves

COST MORE PER BRUSH
COST LESS PER CAR MILE

W. J. Jeandron
Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.

Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd.,
Montreal and Toronto

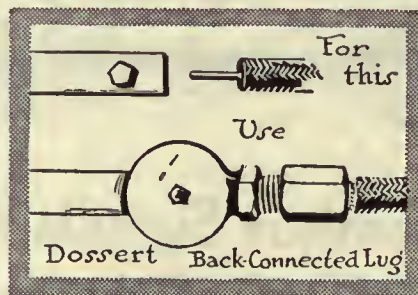
*By all means
make the test*

OF FLOWER BRUSH HOLDERS

MANUFACTURED

for rotary converters, gen-
erators, railway and indus-
trial motors

D. B. Flower
1217 Spring Garden Street
Philadelphia, Pa.



B. C. Lug

The back connected lug is another Dossert—from the large line of standardized electrical connections. All Dosserts have the tapered sleeve principle.

All are shown in the 20th Year Book.
Send for your copy.

GET THIS BOOK

*SOLDERLESS
CONNECTORS
CATALOGUE FIFTEEN*

FREE

Dossert & Co.
242 West 41st Street
New York, N. Y.

ROOT

Life Guards and Snow Scrapers

for all types of cars and buses

Write for specifications and quotations

ROOT SPRING SCRAPER CO.
Kalamazoo, Mich.



TRUCK WITH TOWER IN RUNNING POSITION

TRENTON TOWER

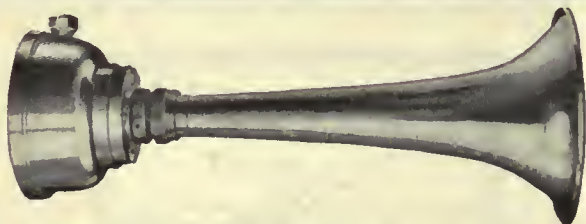
This 3-Section

is not only more convenient, but stronger than the older type.

The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

We'll gladly send you details.

J. R. McCARDELL CO.
Trenton, New Jersey, U. S. A.



Strombos Signals for Railway Service

A pleasing sound of tremendous volume is emitted from the powerful Strombos Signal which is admirably suited for railway service. Day in, day out, it broadcasts a warning of approaching danger and promotes safe and efficient railway operation.

The Strombos Signal operates on an air pressure of 10 lbs. and over and is controlled by lever valve and cord. It uses only 1/10 the volume of air required by a whistle. It has no moving parts which might fail in the emergency.

Write us for more complete data.

AMERICAN STROMBOS CO.,
INCORPORATED
18th & Market Sts., Philadelphia, Pa.

Est. 1854

LUDLUM

SEMINOLE

UNBREAKABLE
HEAVY DUTY CHISEL STEEL

UNPARALLELED FOR CHISELS,
RIVET SETS, PUNCHES, DIES.
WRITE FOR OUR INTERESTING
BOOK ON TOOL STEELS

WE HAVE A SPECIAL
TOOL STEEL FOR
EVERY SPECIFIC
PURPOSE

LUDLUM
SPECIAL STEELS
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STEELS
SPECIAL PURPOSES
WATERVLIET, N. Y., U.S.A.

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
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Manufacturers of Steel Structures of all classes
particularly **BRIDGES AND BUILDINGS**

ALSO STEEL BARGES FOR HARBORS AND RIVERS, STEEL TOWERS
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Tool Steel Gears and Pinions
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Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints;
Splice Bars; Hard Center Frogs; Hard Center
Mates; Rolled Alloy Steel Crossings; Abbott and
Center Rib Base Plates; Rolled Steel Wheels and
Forged Axles; Tie Rods; Bolts; Tie Plates and
Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

American Steel & Wire Company

Chicago
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The DIFFERENTIAL CAR



Standard on
60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

WHARTON

TRACKWORK

Switches, Mates, Frogs

Complete layouts of all kinds

Made by the originators of

Manganese Trackwork

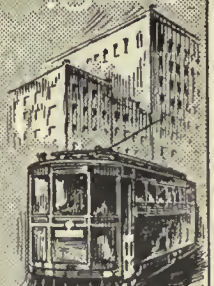
Wm. Wharton Jr. & Co., Inc.

Easton,

Pa.

'CARNEGIE'

for
WHEELS
AXLES
RAILS
CROSS TIES



Carnegie Steel Company
PITTSBURGH, PENNA.

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of
Water Tube Boilers
of continuing reliability

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PITTSBURGH, Farmers Deposit Bank Building
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Bayonne, N. J.
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Makers of Steam Superheaters
since 1898 and of Chain Grate
Stokers since 1893

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NEW ORLEANS, 521-5 Baronne Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

Triple Mileage with THORNTON Side Bearing Trolley Wheels



J. F. Schmidlapp, M. M.,
Ohio Valley Electric Rail-
way Company, Huntington,
W. Va., writes,

"We have been using the
THORNTON trolley wheel
and nothing else for more
than a year, and in check-
ing up find this wheel has
been making more than
three times the mileage of any wheel we
have ever used. The average has been
more than 15,000 miles."

THORNTON TROLLEY WHEEL CO., Inc., Ashland, Ky.

THE WORLD'S STANDARD

"IRVINGTON"

Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.

Sales Representatives in the Principal Cities



We make a specialty of
**ELECTRIC RAILWAY
LUBRICATION**

We solicit a test of TULC
on your equipment

The Universal Lubricating Co.

Cleveland, Ohio

Chicago Representatives: Jameson-Ross Company,
Straus Bldg.

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley
Wheels and Harps has been
demonstrated by large and small
electric railway systems for a
period of thirty years. Being
exclusive manufacturers, with
no other lines to maintain, it is
through the high quality of our
product that we merit the large
patronage we now enjoy. With
the assurance that you pay no
premium for quality we will
appreciate your inquiries.



THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.



They're different—and better!

"Ideal" Trolley Wheels

Two points of difference are the light, soft-
stamped low carbon, steel flanges which take
the wear and tear of side thrust on the wire
—and the integral cast copper-lin alloy con-
tact ring and hub which provides for current
collection with minimum resistance.

These two points alone mean greater mileage,
closer following of wire and high speed and
smooth, silent running.

Ask for further particulars and for sample to test
on your cars.

Edward P. Sharp

L. E. Harmon, Prop.

27-31 Mechanic St., Buffalo, N. Y.

Sales Representatives
R. D. Nuttall Co.
Pittsburgh, Pa.
Also all Westinghouse
E. & M. Co. and
General Electric Co.
District Offices.

Railway Utility Company

CAR COMFORT WITH

UTILITY

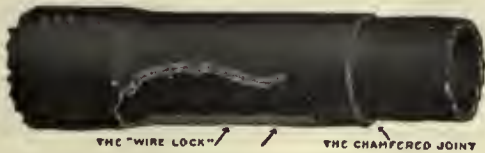
Heaters

Ventilators

Regulators

Write for Catalogue

141-151 West 22nd St., Chicago, Ill.
1328 Broadway, New York, N. Y.

ELRECO TUBULAR POLES**COMBINE**

Lowest Cost **Lightest Weight**
Least Maintenance **Greatest Adaptability**

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
 CINCINNATI, OHIO

New York City, 30 Church Street

"The Standard for Rubber Insulation"

INSULATED WIRES and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

Send for Handbook

The Okonite Company

The Okonite-Callender Cable Company, Inc.

Factories, PASSAIC, N. J.

PATERSON, N. J.

Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta
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Pettingell-Andrews Co., Boston, Mass.

F. D. Lawrence Electric Co., Cincinnati, O.

Novelty Electric Co., Phila., Pa.

Gen. Rep.: Engineering Materials Limited, Montreal.

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Reg. U. S. Pat. Office

Incandescent Lamp Cord

AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE

TROLLEY WIRE

WEATHERPROOF WIRE AND CABLE

PAPER INSULATED UNDERGROUND CABLE

MAGNET WIRE

AMERICAN ELECTRICAL WORKS
 PHILLIPSDALE, R. I.

Boston, 176 Federal; Chicago, 112 W. Adams;
 Cincinnati, Traction Bldg.; New York, 100 E. 43rd St.

AUTOMATIC SIGNALS

Highway Crossing Bells

Headway Recorders

Flasher Relays



NACHOD SIGNAL COMPANY, INC.
 LOUISVILLE, KENTUCKY.



AIMco Electric Railway
 Automatic Signals

for Accessibility and Reliability

EST. 1885 **AIMco** INC. 1918
"American" INSULATING MACHINERY COMPANY

REG. U.S. PAT. OFF.

Philadelphia, New York, Paris, England

Sales Agents:

Electric Service Supplies Co.
 Philadelphia New York Chicago

*The Hardware makes the line
 Hubbard makes the Hardware*



Hubbard and COMPANY
 PITTSBURGH OAKLAND, CAL. CHICAGO

ROEBLING

WELDING CABLE

ELECTRICAL WIRES and CABLES

John A. Roebling's Sons Company, Trenton, N. J.

Chapman
Automatic Signals
 Charles N. Wood Co., Boston

**AUTOMATIC BLOCK SIGNALS**

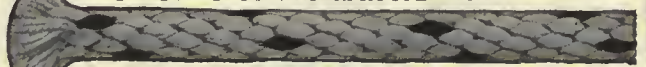
for single track and stub end protection

United States Electric Signal Co.

Louisville, Kentucky



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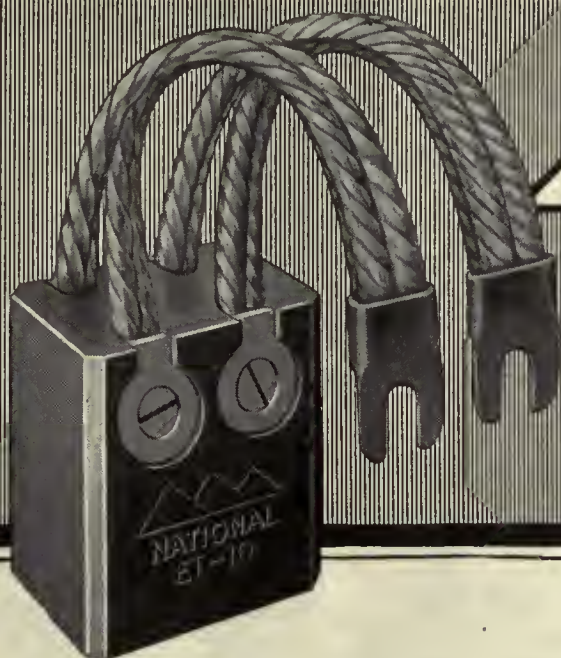
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- Insulators (See also Line
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Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hemingway Glass Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.
- Interior Side Linings
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- Jacks (See also Cranes,
Hoists and Lifts)
Columbia Machine Wks.
Elec. Service Supplies Co.
- Joints, Rail (See Rail Joints)
- Journal Boxes
Brill Co., J. G.
St. Louis Car Co.
- Joint Boxes
Std. Underground Cable Co.
- Lacquers Finishes
Egyptian Lacquer Mfg. Co.
- Lamps, Guards and Fixtures
Elec. Service Sup. Co.
General Electric Co.
Westinghouse E. & M. Co.
Lamps, Arc and Incandescent
(See also Headlights)
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Westinghouse E. & M. Co.
Lamps, Signal and Marker
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Nichols-Lintern Co.
- Lanterns, Classification
Nichols-Lintern Co.
- Letter Boards
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- Lighting Systems
Leece Neville Co.
- Lighting Protection
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Dossert & Co.
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Electric Service Sup. Co.
Hubbard & Co.
More Jones Brass & Metal
Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Locking Spring Boxes
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Cummings Car & Coach Co.
General Electric Co.
Westinghouse E. & M. Co.
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- Lubricating Engineers
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Texas Company
Universal Lubricating Co.
Lubricants, Oil and Grease
Standard Oil Co. of
Indiana
Texas Company
Universal Lubricating Co.
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- Paving Guards, Steel
W. S. Godwin Co., Inc.
- Paving Material
Amer. Br. Shoe & Fdy. Co.
- Pickups, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.
- Pinion Pulleys
Elec. Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.
- Pinions (See Gears)
- Pins, Case Hardened, Wood
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Sharp Edw. P.
Westinghouse Tr. Brake Co.
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Hubbard & Co.
- Pole Reinforcing
Hubbard & Co.
- Poles and Ties Treated
Bell Lumber Co.
- Poles, Ties, Posts, Piling and
Lumber
Bell Lumber Co.
Nugle Pole & Tie Co.
Poles, Trolley
Anderson Mfg. Co., A. &
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Electric Service Sup. Co.
Nuttall Co., R. D.
- Poles, Tubular Steel
Elec. Ry. Equipment Co.
National Tube Co.
- Potholes
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Okonite-Collender Cable Co.,
Inc.
- Power Houses
American Bridge Co.
Power Saving Devices
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- Pressure Regulators
General Electric Co.
Westinghouse E. & M. Co.
- Pumps
A. S. Cameron Steam Pump
Wks. (Ingersoll-Rand Co.)
Ingersoll-Rand Co. (A. S.
Cameron Steam Pump
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- Pumps, Air Lift
Sullivan Machinery Co.
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Ludlum Steel Co.
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- Rattans
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Cummings Car & Coach Co.
Electric Service Sup. Co.
Hale-Kilburn Co.
Heywood-Wakefield Co.
St. Louis Car Co.
- Registers and Fittings
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Electric Service Sup. Co.
Ohmer Fare Register Co.
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- St. Louis Car Co.
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- Resistance, Wire and Tube
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- General Electric Co.
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- Roofs, Car & Bus
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- Roofing, Car
Fantasote Co., Inc.
- Rollers, Bearing
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- Sanders, Track
Brill Co., The J. G.
- Electric Service Sup. Co.
Nichols-Lintern Co.
Ohio Brass Co.
- St. Louis Car Co.
- Sash Fixtures, Car
Brill Co., The J. G.
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- Sash, Metal, Car Window
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Insulated
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- Seats, Bus
Hale-Kilburn Co.
Heywood-Wakefield Co.
St. Louis Car Co.
- Seats, Car (See also Rattans)
Brill Co., The J. G.
Hale-Kilburn Co.
- Heywood-Wakefield Co.
St. Louis Car Co.
- Seating Materials
Brill Co., J. G.
Hale-Kilburn Co.
Haskelite Mfg. Corp.
- Fantasote Co., Inc.
St. Louis Car Co.
- Second Hand Equipment
Electric Equipment Co.
- Gerke, J. W.
Hyman-Michaels
Transit Equip. Co.
- Shades, Vestibule
Brill Co., The J. G.
- Shovels
Brill Co., The J. G.
Hubbard & Co.
- Side Bearings (See Bearings
Center and Side)
- Signals, Car Starting
Electric Service Sup. Co.
Nat'l Pneumatic Co., Inc.
- Signal Systems, Block
Electric Service Sup. Co.
Nacht Signal Co., Inc.
U. S. Electric Signal Co.
Wood Co., Chas. N.
- Signal Systems, Highway
Crossing
Nacht Signal Co., Inc.
U. S. Electric Signal Co.
- Signals, Indicating
Nichols-Lintern Co.
- Slack Adjusters (See Brake
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- Sleeve Wheels and Cutters
Anderson Mfg. Co., A. &
J. M.
- Columbia Machine Wks.
Elec. Ry. Equipment Co.
Electric Service Sup. Co.
More Jones Brass & Metal
Co.
- Nuttall Co., R. D.
- Smokestacks, Car
Nichols-Lintern Co.
- Snow-Plows, Sweepers and
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Brill Co., The J. G.
Columbia Machine Wks.
Consolidated Car Fender Co.
Cummings Car & Coach Co.
Root Spring Scraper Co.
St. Louis Car Co.
- Snow Sweeper, Rattan
Heywood-Wakefield Co.
John-Manville, Inc.
- Soldering and Brazing Ap-
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- Special Adhesive Papers
Irvington Varnish & Ins. Co.
- Special Trackwork
Bethlehem Steel Co.
Buda Company
Lorain Steel Co.
Wm. Wharton, Jr. & Co.,
Inc.
- Spikes
Amer. Steel & Wire Co.
- Splicing Compounds
Westinghouse E. & M. Co.
- Splicing Sleeves (See Clamps
and Connectors)
- Springs, Car and Truck
American Steel Foundries
Amer. Steel & Wire Co.
Brill Co., The J. G.
Standard Steel Works
St. Louis Car Co.
- Sprinklers, Track and Road
Brill Co., The J. G.
Cummings Car & Coach Co.
St. Louis Car Co.
- Steel Castings
Wm. Wharton, Jr. & Co.,
Inc.
- Steel and Steel Products
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- Steel, Car
Morton Mfg. Co.
- Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.
- Storage Batteries (See Bat-
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- Strain, Insulators
Anderson Mfg. Co., A. &
J. M.
- Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Strand
American Steel & Wire Co.
Roebbing's Sons Co., J. A.
- Superheaters
Babcock & Wilcox Co.
- Sweepers, Snow (See Snow
Plows, Sweepers and
Brooms)
- Switch Stands and Fixtures
Ramapo Ajax Corp.
- Switches, Selector
Nichols-Lintern Co.
- Switches, Tee Rail
Ramapo Ajax Corp.
- Switches, Track (See Track
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- Switches and Switchboards
Electric Service Sup. Co.
General Electric Co.
Westinghouse E. & M. Co.
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- Railway Track-work Co.
- Tapes and Cloths (See Insu-
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- Thermostats
Gold Car Heating & Light-
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Railway Utility Co.
Smith Heater Co., Peter
- Ticket Trippers & Destroyers
Electric Service Sup. Co.
- Ties and Tie Rods, Steel
Carnegie Steel Co.
Godwin Co., Inc. W. S.
International Steel Tie Co.
Ludlum Steel Co.
- Ties, Wood Cross (See Poles,
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- Tires
Flisk Tire Co.
General Tire & Rubber Co.
Goodyear Tire & Rubber
Co.
- Tongue Switches
Wm. Wharton, Jr. & Co.,
Inc.
- Tool Steel
Bethlehem Steel Co.
- Tools, Track & Miscellaneous
Amer. Steel & Wire Co.
Columbia Machine Wks.
Electric Service Sup. Co.
Hubbard & Co.
Railway Track-work Co.
- Torches, Acetylene (See Cut-
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- Tower Wagons & Anto
Trucks
McCardell & Co., J. R.
- Towers and Transmission
Structures
Archbold-Brady Co.
Westinghouse E. & M. Co.
- Track Expansion Joints
Wm. Wharton, Jr. & Co.,
Inc.
- Track Grinders
Metal & Thermit Corp.
Railway Track-work Co.
- Rail Welding & Bonding Co.
Una Welding & Bonding Co.
- Trackless Trolleys
St. Louis Car Co.
- Track, Special Work
Bethlehem Steel Co.
Columbia Machine Wks.
Ramapo Ajax Corp.
Wharton, Jr. & Co.,
Inc. W.
- Transfer (See Tickets)
- Transfer Issuing Machines
Ohmer Fare Register Co.
- Transformers
General Electric Co.
Allis-Chalmers Mfg. Co.
Westinghouse E. & M. Co.
- Treads, Safety, Stair Car
Step
Irving Iron Works
Morton Mfg. Co.
- Trolley Bases
Anderson Mfg. Co., A. J. &
J. M.
- General Electric Co.
More Jones Brass & Metal
Co.
- Nuttall Co., R. D.
Ohio Brass Co.
- Trolley Bases, Retrieving
Anderson Mfg. Co., A. &
J. M.
- Nuttall Co., R. D.
Ohio Brass Co.
- Trolley Bases
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.
- Trolley Material (Overhead)
Anderson Mfg. Co., A. &
J. M.
- Bates Expanded Steel Truss
Electric Service Sup. Co.
More Jones Brass & Metal
Co.
- Ohio Brass Co.
Westinghouse E. & M. Co.
- Trolley Shoes
Miller Trolley Shoe Co.
- Trolley & Trolley Systems
Ford Chain Block Co.
- Trolley Wheels (See Wheels,
Trolley)
- Trolley Wheel Bushings
More Jones Brass & Metal
Co.
- Trolley Wheels and Harps
Electric Service Supplies Co.
More Jones Brass & Metal
Co.
- Thornton Trolley Wheel Co.
- Trolley Wire
Amer. Electrical Works
American Steel Foundries
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
Bridgeport Brass Co.
Roebbing's Sons Co., J. A.
- Rome Wire Co.
- Trucks, Car
Brill Co., The J. G.
Cummings Car & Coach Co.
St. Louis Car Co.
- Truss Planks
Haskelite Mfg. Corp.
- Tubing, Yellow and Black,
Flexible Varnish
Irvington Varnish & Ins. Co.



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Electric Service Sup. Co.
Perey Mfg. Co., Inc.

Turntables
American Bridge Co.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Varnished Papers
Irvington Varnish & Ins. Co.

Varnished Silks
Irvington Varnish & Ins. Co.

Ventilators, Car
Brill Co., The J. G.
Nat'l Ry. Appliance Co.
Nichols-Lintern Co.
Railway Utility Co.
St. Louis Car Co.

Vestibule Linings
Haakelite Mfg. Corp.

Welded Rail Joints
Electric Railway Improvement Co.
Metal & Thermit Corp.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

Welders, Portable Electric
Electric Railway Improvement Co.
Metal & Thermit Corp.
Ohio Brass Co.
Railway Track-work Co.
Westinghouse E. & M. Co.

Welding Processes and Apparatus
Electric Railway Improvement Co.
General Electric Co.
International Oxygen Co.

Metal & Thermit Corp.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welding Steel
Electric Railway Improvement Co.
Railway Track-work Co.
Una Welding & Bonding Co.

Welding Wire
American Steel & Wire Co.
General Electric Co.
Railway Track-work Co.
Roebbing's Sons Co., J. A.

Welding Wire and Rods
Railway Track-work Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car Steel & Steel Tire
Carnegie Steel Co.
Standard Steel Works

Wheels, Trolley
American Steel Foundries
Columbia Machine Wks.
Elec. Ry. Equipment Co.
More Jones Brass & Metal Co.
Sharp, Edw. P.

Wheels, Trolley, Wrought Steel
Electric Service Sup. Co.
General Electric Co.
Illinois Steel Co.
Nuttall Co., R. D.

Wheels, Wrought Steel
Carnegie Steel Co.
Ludlum Steel Co.

Whistles, Air
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Wire Rope
Amer. Steel & Wire Co.
Roebbing's Sons Co., J. A.

Wires and Cables
American Steel Foundries
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Bridgeport Brass Co.
General Electric Co.
Okonite Co.
Okonite-Callender Cable Co., Inc.
Roebbing's Sons Co., J. A.
Roma Wire Co.
Std. Underground Cable Co.
Westinghouse E. & M. Co.

Pointing the Way to Success



WITH

MODERN CARS

Brooklyn City Railroad, like many other enterprising electric railways, recognized the importance of bright, new and attractive cars to its future development.

An investigation will show what can be accomplished with MODERN CARS in reducing operating and maintenance costs, and increasing revenue by stimulating the riding habit.



THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

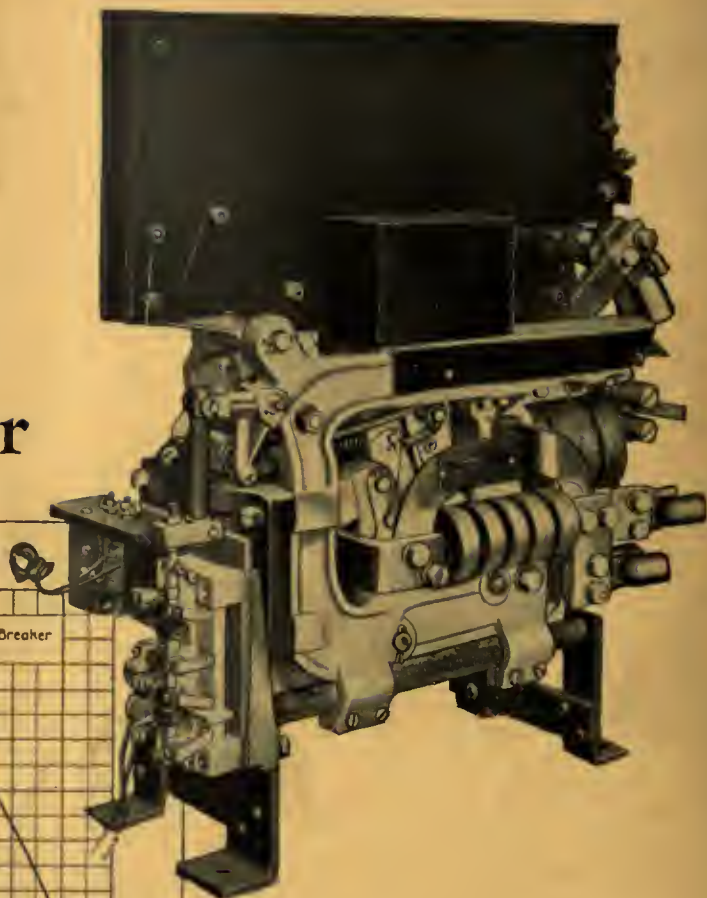
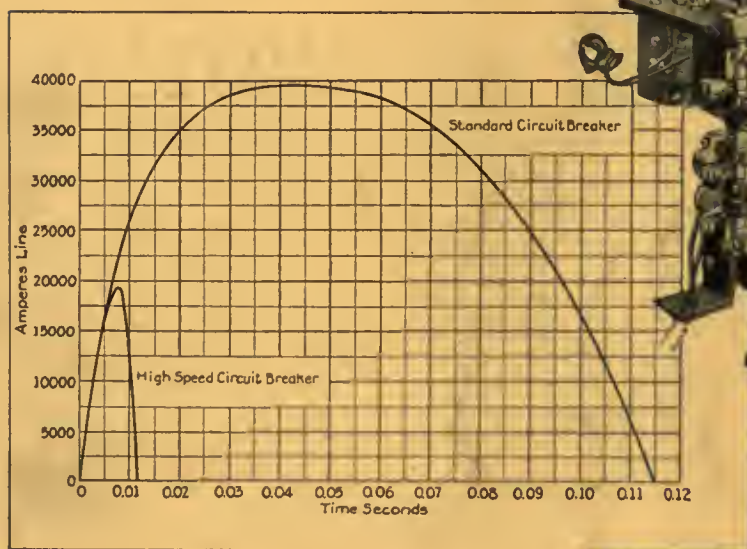


AMERICAN CAR CO. —
ST. LOUIS, MO.

G. C. KUHLMAN CAR CO. —
CLEVELAND, OHIO.

WASON MANFG CO.
SPRINGFIELD, MASS.

The G-E High-Speed Circuit Breaker



—and the measure
of its greater protection



Even a hasty glance at these two curves impresses one with the extremely high speed and the effectiveness of this breaker for limiting short-circuit currents. G-E high-speed Breakers have been giving ideal protection in hundreds of installations since 1917.

This type of circuit breaker has been uniformly successful in protecting substation apparatus, substation feeders, and electric locomotives. The reduction in current and flashing that results from its use greatly decreases wear of commutator and brushes and practically eliminates damage from internal grounding. It also insures greater reliability and lower substation maintenance.

GENERAL ELECTRIC

ELECTRIC RAILWAY JOURNAL

UNITED STATES TIRES ARE GOOD TIRES

The Tire that is Really Equal to the New Demands of the Modern Motorcoach

THE U. S. Royal Cord Motorcoach tire has been built *definitely* for motorcoach service. To make this clear the word "Motorcoach" has been placed on the sidewall.

Every detail of its construction has been designed to stand the rigors of the most severe strains, the heaviest loads and the most unfavorable roads.

U. S. Tire engineers have studied the tire requirements of the motorcoach from the beginning of bus transportation. They designed the first pneumatic bus tire and were responsible for many of the greatest advancements in this type of tire.

To aid them in accurately determining the actual needs of motorcoach operation, the United States Rubber Company maintained corps of trained tire experts in every part of the country to make a day-to-day study of operating conditions.

Sprayed Rubber tread, Latex-Treated Web Cord carcass and broad, flat tread profile insure the lowest possible cost per tire mile.

United States  Rubber Company
Trade Mark

UNITED STATES
ROYAL CORD
Motorcoach





Rail Transportation Should Be Up to Modern Standards

Where there is a determination there
is a way to retire obsolete cars

Since Fulton, in 1807, built his steamboat "Clermont" the development in the marine field has been rapid. First ships with one propeller, driven by reciprocating steam engines, then turbine driven ships with three propellers and now Diesel-electric driven motorships. Throughout this development it has been necessary to rapidly replace the obsolete with the new.

And, as in the marine field,—

so with the electric car, since first operated forty-one years ago, the development has been tremendous until today electric traction is recognized as the most economical method of mass transportation.

But to retain this prestige—

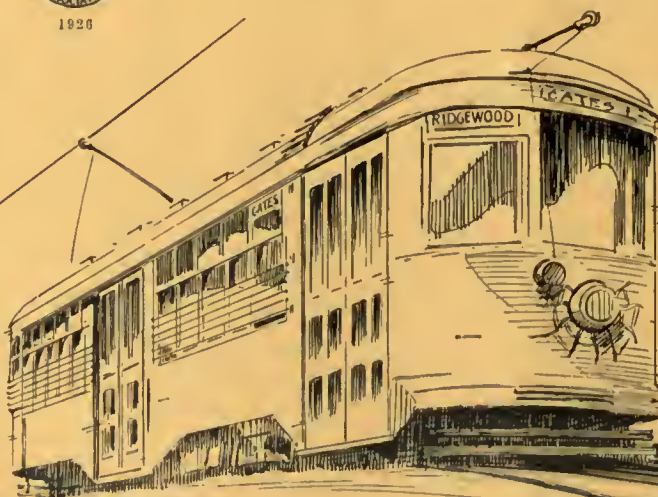
it is essential to replace obsolete rolling stock with modern light-weight cars.

Many railway companies have consistently adhered to this policy. In referring to the 28,000 obsolete street cars now in service J. N. SHANNAHAN, past president of the American Electric Railway Association, has said "I would relegate to the scrap pile the old, heavy and obsolete cars, replacing them with new, brighter and lighter cars. Of our immediate needs, possibly none is greater than that of improved service, through the installation of new equipment."

How many of the 28,000 obsolete cars have you?

Modern street cars attract patronage.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of
the United States and Foreign Countries



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Vol. 67
No. 9

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Facts Have No Bias

REAL service can be rendered to the readers by a technical publication only when it adopts for its motto the oath required of a witness in court, to tell "the truth, the whole truth and nothing but the truth." While it is within the proper sphere of such a paper to have and express definite opinions of its own on controversial subjects, it would be unjustifiable to suppress facts because they tend to contradict the paper's opinion. Such has always been the policy of ELECTRIC RAILWAY JOURNAL.

Evidence comes to hand from time to time showing that this attitude is widely recognized. Recently a letter was received from the secretary of a city commission which is considering the purchase of its local street railway system. The letter said in part:

I have information through the medium of..... that articles containing interesting and valuable information relative to ownership and operation of street railway systems by municipalities have appeared in ELECTRIC RAILWAY JOURNAL during the past two or three years. This publication is not on file in our public library, and if it would not be too much trouble, I will appreciate your referring me to the issues which contained articles based on first-hand investigations of the situation in Detroit and other cities.

Municipal ownership in this country has not been favored by this paper. For years that has been one of its editorial policies. Nevertheless, facts have been published regardless of whether they were favorable or unfavorable to municipal ownership. So the city commission which is seriously considering this subject naturally turns to the JOURNAL as a source of unbiased information.

McGRAW-HILL PUBLISHING COMPANY, Inc.

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(Published in Chicago)
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(Published in London)



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For Satisfactory Service Use UB and DB Section Insulators



They Are Quickly Installed

Note the following features:

Double insulation—Hickory runner and two air-gaps.

Two air-gaps with bronze arcing tips on both sides—something which no other section insulator has.

Complete under-run can be replaced in a very short time without removing the insulator from the line.

The insulators can be supported either at both ends or at the center.

Furnished with either single or double beam.

Complete under-runs of both single and double-beam insulators are interchangeable. The main body of the insulators will last indefinitely.

Equipped with Bayonet approaches.



1926 ~

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East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of
the United States and Foreign Countries



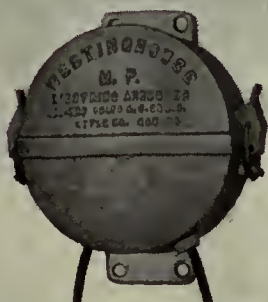
Westinghouse

X87234

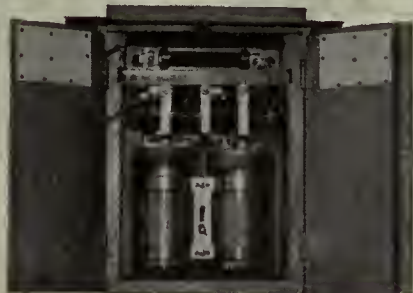
Assured Protection

for your cars—your line—your
stations is obtained by installing

Westinghouse Direct-Current Lightning Arresters



MP Arrester, 100-750 Volts



Type AR Electrolytic Arrester
For Voltage up to 3800



Type K-3
For Voltage up to 1500

MP Arrester

This low-priced arrester is adequate for the protection of cars under all ordinary conditions, one to the car and five to the mile of line. It is easy to install and, once installed, requires practically no attention.

The MP arrester has a long life and affords greater freedom of discharge than any other type using series resistance.

For extra severe 600-volt, and all 1200 and 1500-volt service, for car and pole mounting, we recommend the

AR Arrester

This is an electrolytic arrester having a high discharge capacity. It is recommended for station service where it can easily be given the required periodic maintenance and is not subjected to freezing temperatures. It is also used extensively on cars.

K-3 Arrester

This is a condenser arrester of high capacity. It requires no attention whatever after installation. It stays on the cars the year round, having no liquids to freeze, no moving parts to wear out, and no glass parts to break.

For further details ask for a copy of Descriptive Leaflet 20021.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the
United States and Foreign Countries



1926



Westinghouse

X 86428



Initial Cost

*Should by no means be the governing element
in deciding motor coach purchases*

Street Car Type
Motor Coach,
Complete,

\$3815

F. O. B. Detroit

But when the *Attractiveness, Safety, Dependability, and Operating Economy* of Graham Brothers Motor Coaches are considered in comparison with others, the *Low Initial Cost* of this coach governs the decision.

GRAHAM BROTHERS

Evansville - **DETROIT** - Stockholm
A DIVISION OF DODGE BROTHERS INC
GRAHAM BROTHERS (CANADA) LIMITED - TORONTO, ONTARIO

GRAHAM BROTHERS MOTOR COACHES

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

Another report from the field!

Our eastern representative writes in "...last reports I had from B...*", show that our ears had passed the 325,000 mark."

*Note: Name on request of Superintendent of Distribution of a large eastern railway system.



O-B Marathon Ears



are making enviable records for endurance where service is frequent and conditions severe. A trolley ear like this, which will endure over three hundred thousand car passes, means many months extra usefulness in the busiest city streets, before replacement is required.

O-B Marathon Ears wear longer because of the extra thickness of the metal lips. This metal is unusually tough and durable, yet ductile enough to form readily when peened on the under side of wire.

The body of the ear is a model of slender gracefulness, without a bump or hump anywhere to obstruct the passage of the wheel. Lips are trimmed off toward the end with a V-shaped cut to insure easiest transition from wire to ear.

Ohio Brass Company, Mansfield, O.
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada



Ohio Brass Co.

PORCELAIN INSULATORS LINE MATERIALS RAIL BONDS CAR EQUIPMENT MINING MATERIALS VALVES

The GARFORD GREYHOUND

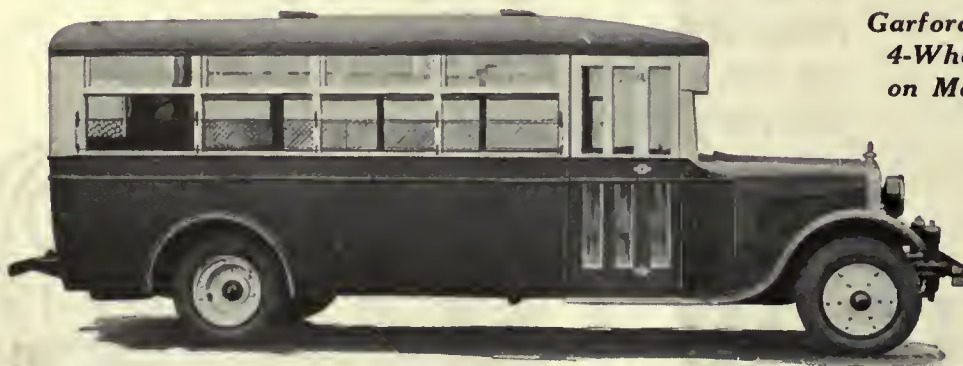
A Fleet, Light Weight Revenue Building Machine

Advanced ideas in bus design and bus transportation practice are expressed by the Garford Greyhound Motor Buses.

Light in weight, well balanced with low center of gravity, gracefully sturdy lines, a quick get-away in traffic and high average speed on inter-city runs, low gasoline consumption, and very reasonable cost of upkeep—all these contribute to the high net earning ability and good-will value of the Greyhound.

In them is the same sound engineering that has made the Garford favorably known, wherever used, for its ability to stay out of the shop and on the road—where it could *earn*.

We will gladly furnish you with full specifications on the Garford Greyhound. See the nearest Garford Dealer or write to Headquarters.



*Garford Pioneered
4-Wheel Brakes
on Motor Buses*

The Garford Motor Truck Company

619 Wapak Road, Lima, Ohio

MOTOR BUSES—17 to 30 PASSENGERS

In 1926

Better Paved Track will cost less

In one city Steel Tie Track is being put down for 13% less than wood ties in stone ballast, rail, joints and paving being the same in both cases.

If your local conditions correspond to those in this city you can make a similar saving.

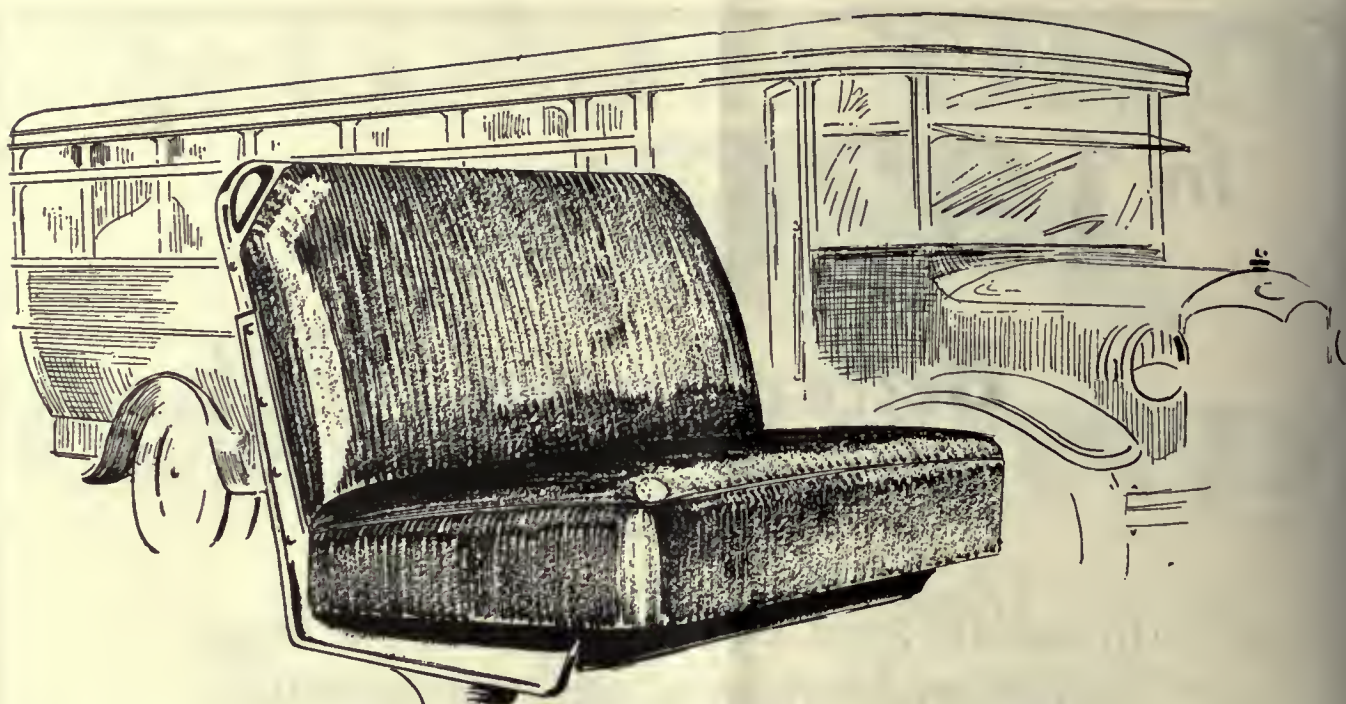
An estimate is the way to determine the facts. To estimate you will need delivered prices on Twin Ties and our collection of 1925 construction cost figures.

We have forwarded this information to more companies this year than ever before. Why not send for yours?

The International Steel Tie Company
Cleveland, Ohio

Steel Twin Tie Track

Renewable Track—Permanent Foundation



Both seats *and* curtains of PANTASOTE

Comfort to please the most fastidious passenger; and as sound an economy as any business man can demand

If the riding public is expecting comfort and good appearance in street railway cars, it is looking for an equally high, if not a higher standard in the buses operated as part of a street railway system.

For the bus is still a new form of transportation; it has promised much to the prospective rider, and it must live up to its promises.

Seats are important. So are curtains. Both are intimately associated with every passenger's riding comfort. Both can be either an eyesore or the keynote of a comfortable, attractive interior.

That is why so many railway-men have saved themselves the expense and risk of taking chances on doubtful materials by specifying Pantasote for bus seats and bus curtains, just as they specify Pantasote for use on their electric cars. They know Pantasote by reputation and experience. They know that the very people who ride the buses have already appreciated Pantasote on the street cars.

And they know too that it pays well to specify a material which is admittedly far superior in wearing qualities to any lower grade leathers or "leather substitutes"; which retains its fresh new appearance through a long life of service; and which is unaffected by any climatic conditions.

But remember, in buying, that only genuine Pantasote has these Pantasote qualities. It will pay you to be quite specific, and to insist on getting just what you specify—genuine Pantasote.

*for bus Seats
for bus Curtains*

THE PANTASOTE COMPANY, INC.
250 Park Avenue, New York City

PANTASOTE

Look ahead
to the year
1951



There is no substitute for experience



YELLOW COACH
plus
GENERAL MOTORS
marks a new era
in building for
STABILITY-

What about the *stability* of the motor coach manufacturing organizations with which you are doing business today?

Estimate your losses arising from "orphan equipment."

Weigh carefully the value of protecting your investment.

Today, 1926. Tomorrow, 1951.

What factors will govern your selection of motor coaches during the years that lie between?

Realizing the stability of the motor coach as a means of transportation, two great organizations have combined all their transportation experience and vast technical resources pertaining to manufacturing so that as the years pass their service may be stronger, their product better, their moral responsibility to the field secure.

Hence, the amalgamation of Yellow Coach and General Motors, recognized as the most significant transportation development of a decade.

Each of these tremendous organizations brings something to the other—and to *you*.

Yellow Coach—Vast operating experience with its resultant assurance of *low-cost, profitable miles*. Manufacturing experience that places Yellow Coaches *on the road*, where they may earn. The famous Yellow Knight Sleeve Valve Engine; the master gauge for power, performance and economy.

General Motors—Unlimited technical resources. Manufacturing experience which can be found only in the greatest automotive manufacturing organization in the world. Such an alliance places *financial stability* back of the coaches you operate. It passes along to you the substantial economies in engineering, manufacturing and merchandising operations which result because of this welding of resources. It places Yellow Coach in an impregnable position, better than ever and assuring a permanent investment in profitable experience.

Yellow Coach and General Motors are *building for security* so that you may buy and operate with *security* for long years ahead, unclouded by doubt or uncertainty.



YELLOW TRUCK & COACH MANUFACTURING CO.
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.

**NP**

**In Texas, ~
Fort Worth's up-to-date Cars
Are fitted with the latest National Pneumatic Equipment**

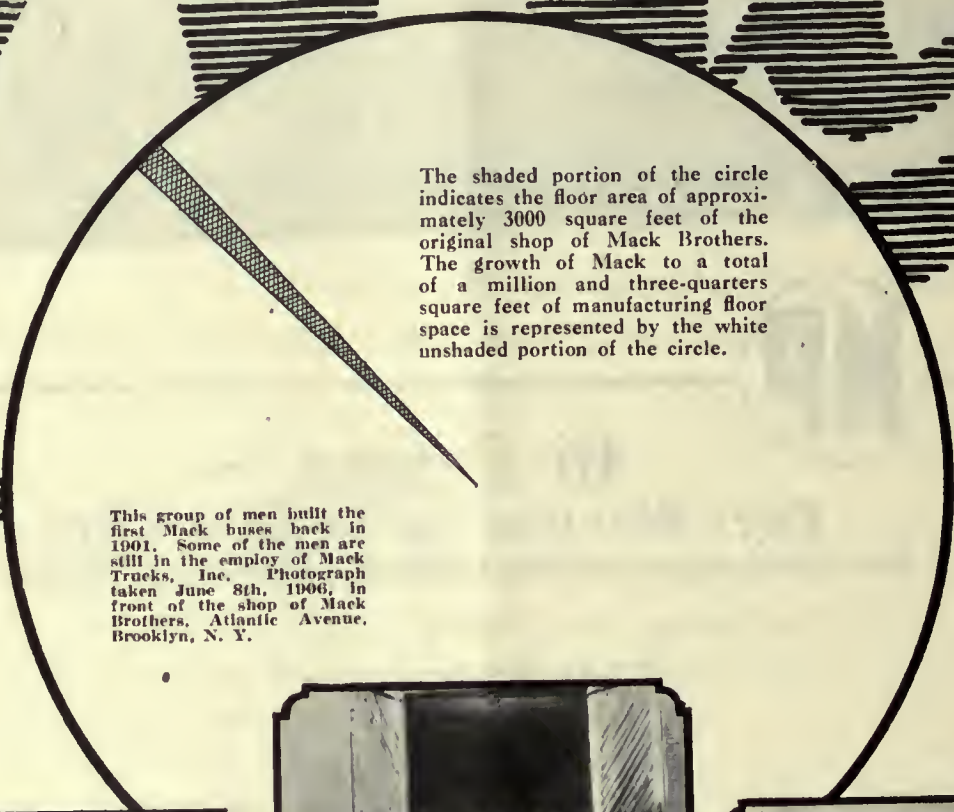
THE Northern Texas Traction Company's fine spirit of public service won the Coffin Prize for Fort Worth's street railway system in 1924. This same spirit resulted in the installation of National Pneumatic Door Engine Equipment on all these up-to-date Fort Worth one-man cars.

NATIONAL PNEUMATIC COMPANY

Executive Office, 50 Church Street, New York

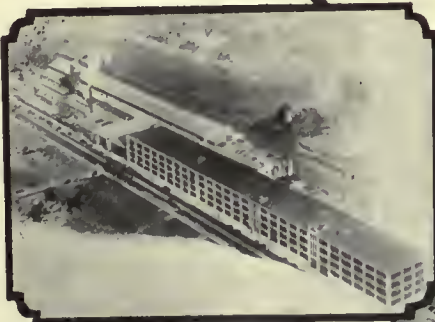
General Works, Rahway, New Jersey

CHICAGO MANUFACTURED IN PHILADELPHIA
518 McCormick Building TORONTO, CANADA, BY 1010 Colonial Trust Building
Railway & Power Engineering Corp., Ltd.

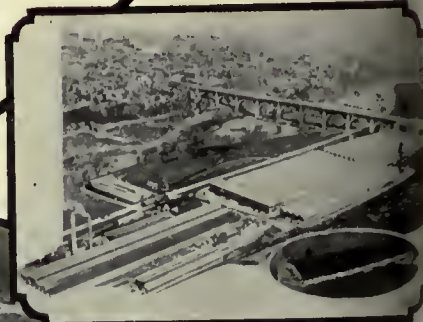


The shaded portion of the circle indicates the floor area of approximately 3000 square feet of the original shop of Mack Brothers. The growth of Mack to a total of a million and three-quarters square feet of manufacturing floor space is represented by the white unshaded portion of the circle.

This group of men built the first Mack buses back in 1901. Some of the men are still in the employ of Mack Trucks, Inc. Photograph taken June 8th, 1906, in front of the shop of Mack Brothers, Atlantic Avenue, Brooklyn, N. Y.



Mack plant at Plainfield, N. J.



Mack plant at Allentown, N. J.



New Brunswick, N. J. plant of Mack Trucks, Inc.





What's behind
the Bus you buy?

From a blacksmith shop to 157 acres of manufacturing!

Just one thing built the tremendous manufacturing and service facilities of Mack—

Demand on the part of Mack users

Twenty-six years ago a small shop and a small corps of men turning out a good product. Today, 1,730,000 square feet of manufacturing space, and on the front line 100 Mack direct factory branches serve the needs of Mack users.

That's growth! Growth built by one thing—the demand for more and more Macks.

Mack users have built the Mack bus. Mack demand has erected three great plants and studded the country with Mack service stations. In short, Mack performance, speaking through Mack owners has done this thing.

Mack supplied the engineering knowledge and manufacturing facilities, but *you* have built the Mack bus and the organization behind it.

MACK TRUCKS, INC.

INTERNATIONAL MOTOR COMPANY

25 Broadway, New York City

One hundred direct MACK factory branches operate under the titles of: "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," "MACK MOTOR TRUCK COMPANY," and "MACK TRUCKS of CANADA, Ltd."



The
Mack
Bus



MODERN ROLLING STOCK

pays for itself!

Figures are available to prove it. More inviting in appearance, more comfortable to ride in, making faster trips and shorter stops, the modern car creates increased patronage and reduces the competition of the private automobile. It builds revenue.

Lighter and faster, it operates at less cost and entails lower maintenance expense.

By increasing revenue and reducing costs, the new car pays for itself in a very few years.

Our engineers are thoroughly conversant with the modern features of car design and construction. Let them co-operate with you in working out plans for your projected new equipment—or we will quote on your specifications.

Cummings Car and Coach Co.

Successors to McGuire Cummings Mfg. Co.

111 W. Monroe Street
Chicago, Illinois



**LIGHT WEIGHT, SINGLE AND
DOUBLE TRUCKS**

SNOW SWEEPERS AND PLOWS

**GAS-ELECTRIC
MOTOR COACHES**



Behind the scenes is where service begins—

To gain a reputation among the riding public for being on time all the time, requires a steady maintenance of schedules with well-kept cars. Such service may be traced back to the efficient repair shop—of which the equipment is an all-important factor.

Keystone Shop Equipment, designed and built for car-shop use, puts a repair shop on a thoroughly modern basis.

Check the list below for items you may need. Then ask for further particulars.

ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA 17th and Cambria Sts.	NEW YORK 50 Church St.	CHICAGO Illinois Merchants' Bank Bldg.
PITTSBURGH 839 Oliver Building	BOSTON 88 Broad Street	SCRANTON 316 N. Washington Ave.
DETROIT General Motors Building		
Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver		

KEYSTONE SHOP EQUIPMENT

PARTIAL LIST OF SHOP SPECIALTIES

Segur Taping Machines
Peerless-Segur Coil
Spreaders and Winders
Peerless Armature Repair
Machines
Electric Baking Ovens
Century Type Testers
Peerless Pinion Pullers
Peerless Floor Cranes

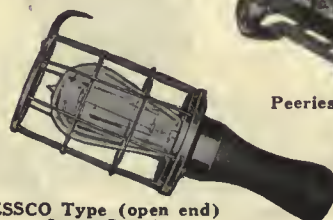
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Portable Lamp Guards
Simplex Jacks
Reading Car Replacers
Electric Drilling Machines
Fountain Window Washers
Keystone Sand Dryers
Contact Rail Material
Cass Commutator Stones



Peerless Pinion Puller



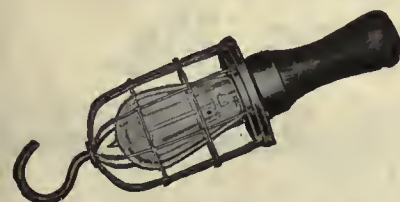
Peerless Pit Jack



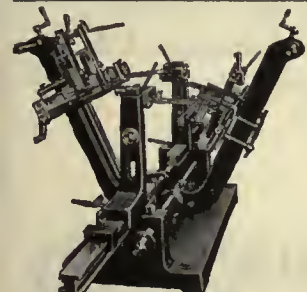
ESSCO Type (open end)
Lamp Guard



Type A Armature Stand



New Keystone Type
Lamp Guard



Peerless Coil Spreader



The Selector Valve permits independent control of entrance and exit doors.

What makes a Safety Car Safe?

The A. E. R. A. committee on Safety Car operation in 1921 defined a Safety Car as "any type of car equipped with *adequate* safety devices for one man operation."

Interlocking of car control, brakes, doors and steps, by means of the Safety Car Control Equipment, meets the requirement stipulated.

It prevents opening the doors before a stop is completed, prevents a start

before the doors are closed, and automatically makes an emergency brake application and shuts off the power if the operator releases the controller handle through carelessness or disability.

Experience has demonstrated that safer transportation is assured when operating responsibility is centralized in one man whose duties are thus safeguarded and simplified by complete protective and labor-saving devices.

SAFETY CAR DEVICES CO.

OF ST. LOUIS, MO.

Postal and Telegraphic Address:
WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

BRAKES!
Variable Load



Modern Brakes for Modern Cars

The most modern form of brake equipment for city cars is the Westinghouse Variable Load Brake.

This equipment was developed specifically for the modern light-weight car having large carrying capacity in relation to light weight. It provides for a uniform braking effect throughout the range of varying load from empty to full capacity. The consistently short stops which are thus effected help to increase safety, speed up schedules, and enhance car earnings.

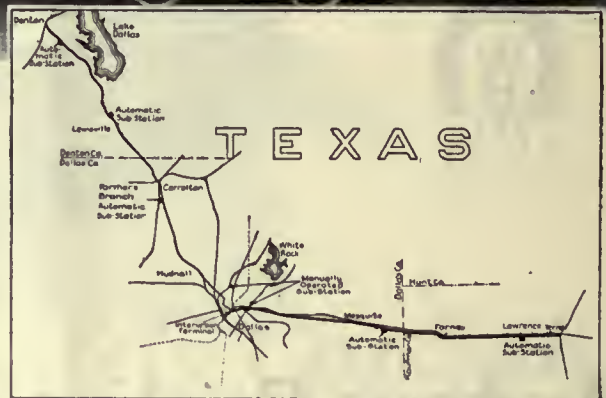
WESTINGHOUSE TRACTION BRAKE CO.

General Office and Works: WILMERDING, PA.

WESTINGHOUSE TRACTION BRAKES



Greater attractiveness and better performance are essential to increased revenue and reduced expense. Both are being achieved by those progressive companies which are operating modern cars.



Three years' operation proved the value of one-man light-weight cars on the Texas Interurban Railway



To meet the requirements of modern rolling stock as exemplified by light-weight, high-acceleration cars, the General Electric Company manufactures motors, control, air brake apparatus, and many smaller items of car equipment. The notable achievements of modern cars thus equipped are written in scores of lowered-maintenance records, and attested by many repeat orders.

Operating costs per car-mile, 1925

Maintenance of way and structure.....	2.9 cts.
Maintenance of equipment.....	1.0 cts.
Power.....	6.2 cts.
Conducting transportation	5.8 cts.
General and miscellaneous.....	11.6 cts.
Total.....	27.5 cts.

Modern equipment used

Weight of cars complete.....	31,530 lb.
Motors (4-35 h.p.).....	GE-265
Control (single-end).....	G-E type K-35
Air Brakes—G-E straight air with emergency feature	
Compressors	G-E type CP-27B

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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CHARLES GORDON, *Editor*

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Speeding Up Railway Operation Helps Local Merchants

ELIMINATION of automobile parking in congested districts will aid retail business rather than injure it. That is an old story to the experienced transportation men of the electric railway industry, but the local merchants usually refuse to believe it. Without taking the trouble to analyze the situation carefully, the average storekeeper jumps to the conclusion that his trade will suffer if customers are not allowed to park their automobiles in front of his door. That the users of public transportation vehicles outnumber the users of private vehicles in the ratio of three or four to one is overlooked.

In Pittsburgh, however, the experiment of prohibiting all parking on certain downtown streets was made in the early part of last year and the results have demonstrated that the apprehension of the merchants was groundless. Checks made by the research department of the Pittsburgh Railways show that there has been a substantial reduction in the running time of street cars since the new parking restrictions have been in effect. Detailed figures are published elsewhere in this issue. It is even more interesting to note that the downtown retail trade has prospered more than that in the outlying sections since the change was made. Industrial depression which prevailed during 1925 resulted in a slight decrease in trade throughout the Pittsburgh district. In the downtown section, however, the effect was less noticeable than in the district as a whole, the volume of business being only 0.8 per cent lower than in 1924, whereas for the entire area the decrease was nearly 3 per cent.

The conclusion seems fairly obvious that the downtown merchants prospered by the enactment of traffic regulations that made it easier for the majority of people to reach their stores. This result is probably no different from that which has followed the establishment of similar regulations in other cities, but Pittsburgh is particularly fortunate in being able to establish the fact by such convincing figures.

New Cars Are Desirable Because They Will Earn More

REPLACEMENT of 28,000 electric railway cars has seemed to some persons such a radical proposal that in certain quarters it has been questioned. "We cannot throw away more than a third of the rolling stock of the industry," say these managers. "How can we finance the purchase of new cars for the purpose when money is not to be had for much-needed extensions?"

Such an attitude naturally does not take into account the real purpose of the plan for using new cars instead of old. No one contends for a moment that these cars can or should be replaced all at once. It will tax to capacity

all the car building plants in the country for several years to carry through such a program, to say nothing of the new cars which are needed for extensions of service.

The real point is that new cars are urged because they will earn their keep. Cars twenty years or more old were built prior to the development of modern equipment and devices, and before steel was used to any considerable extent in framing. Nearly all such cars are heavy for their carrying capacity. Platforms, doors, aisles and step heights were not designed to get riders in and out quickly or efficiently. Provisions for fare collection are inadequate. The trucks and motors are relatively inefficient. Then, too, with twenty years or more to their credit they are not able to give the quality of service they once could, nor to operate at the same cost for maintenance.

It can be shown easily that new cars are an economy. Mr. Storrs has done that in several addresses. Mr. Budd in his Indianapolis paper before the Central Electric Railway Association not only gave a few examples of what new cars have done, but he listed a dozen roads that have increased their revenue, both gross and net, in the past five years. A factor of no inconsiderable importance in each case was the substitution of new cars for old. What does the cost of new cars matter if the net revenue can be increased materially due to their use?

Merger of Electric Railway and Bus Manufacturers Should Speed Co-ordination

TRANSPORTATION men should view with favorable interest the recent consolidation of the American Car & Foundry, Brill and Fageol interests. Here large builders of steam railroad and electric railway cars have added to their interests a going bus manufacturing business of considerable size and importance. The new company now stands in the unusual position of being prepared to sell transportation vehicles of practically every type now seriously considered. The principal men in the new company have wide experience in their respective fields. By combining their knowledge and financial resources as they have, the way is opened for constructive thinking of the kind that should prove helpful to the industry at this time.

Never before in the history of the transportation industry has there been more need for care in the selection of the type of vehicle to be used, particularly in local systems. While engineers may estimate the results to be anticipated with this or that method, it remains for the builder to produce the vehicle which will carry out the proposal. It has been seen repeatedly that such elements as vehicle weights and operating speeds spell the difference between success and failure. The manufacturers' engineering committee, recently formed

under the auspices of the American Electric Railway Association by car builders and equipment men, can do much in pointing out these things. But the result must necessarily lie with the company that actually builds the equipment.

Consideration of the bus in connection with many of the problems of local transportation makes it essential that its use be given careful study and fair and unbiased treatment. For the first time a manufacturer is in the position to build either cars or buses as desired. This gives it the opportunity to study in a practical and unbiased way the advantages and the limitations of each method of transportation under different operating conditions. This it can do if it will reveal its findings without fear or prejudice. By grasping its opportunities it is in an enviable position to aid the movement for co-ordination and modernization of transportation methods. Through the wide and diversified experience of its personnel, it can give a greater measure of constructive help than was possible when the companies were divided and operated individually.

Skillful Public Relations Work

Made Part of a Rehabilitation Program

METHODS by which transportation revenue has been increased 65 per cent in three years on the Chicago, Aurora & Elgin Railroad are told of elsewhere in this issue in the first of several articles describing the rehabilitation of the property. Many factors have contributed to the development. The territory is a highly competitive field in which four steam railroads operate suburban service in addition to that provided by the electric line. It has been necessary, therefore, to use every available means of building up the traffic.

Of greatest importance in the success which has attended the efforts of the company has been the really high-class service rendered by the Aurora-Elgin line. Many new and modern cars have been bought. Track has been thoroughly rehabilitated, using stone ballast in place of gravel. Old stations have been spruced up and attractive new stations built. Power facilities have been improved. Signals and additional crossing protection devices have been installed.

Besides the great improvement which has been made in the physical plant, skillful work has been done in fostering good public relations. Among the interesting steps taken in this direction might be mentioned the issue of special low-rate homeseekers' tickets. These have been used to encourage residents of Chicago to go out into the Aurora-Elgin territory to examine its possibilities as sites for future homes. Many people whose first knowledge of this electric railway was acquired in this manner have now become regular patrons.

Commutation tickets have furnished another means of cultivating public relations. Whenever a new name appears on the list of buyers of monthly tickets, the management sends a special message of greeting expressing the hope that the new ticket buyer will find the service satisfactory and requesting his co-operation in finding ways to improve it. In case an old name disappears from the list of commutation ticket buyers a representative of the management calls to find out why the former user has dropped out. In this way

many minor shortcomings of the service have been discovered, and by the exercise of tact and diplomacy former customers have been won back to the railway. The possibility of copying these particular methods does not exist on every railway, but alertness to take advantage of the opportunities that do exist, however, will usually do much to improve public relations and build up traffic.

Boston Figures

Deserve Careful Study

LIGHTLY to pass over the record of the Boston Elevated Railway for 1925 as disclosed by the digest of the annual report in the issue of the JOURNAL for Feb. 13 would be a mistake for others engaged in the work of the industry. That report as presented by the public trustees to the state reflects not only the record of the road itself, but it contains in its statistics many unit figures that are of immeasurable value for comparative purposes. Of the value of these to him each reader must judge for himself. Aside from all this, however, there are certain points which should perhaps be emphasized.

Of particular interest is the attitude of the company on the matter of buses. The management is ready to furnish bus service wherever it appears desirable to do so. It might at first be thought that this was only a generality, but that is not so when the record of increase from 63,937 bus passengers in 1922 to 2,472,456 passengers in 1925 is considered. The chartered bus is also becoming a factor at Boston. Of interest, too, is the plan made for parking automobiles outside of congested centers and inducing their users to journey into the city on the car lines. Particularly proud are the trustees of the record that shows that only 12.7 per cent of the passenger cars now in service on their lines are more than twenty years old compared with the fact that of the 82,340 cars in the United States in similar service 34 per cent are of greater age. The accident record also reflected the intensive work that is being done to decrease the hazard to the passenger.

One of the saving features at Boston is that a broad discretion is vested in the trustees to change the rates of fare when necessary, but their acts are subject at all times to the principle of service at cost. True, \$2,327,816 is due to the cities under the provisions of the public control act that if in any year the established rates of fare do not meet the cost of service and the reserve fund of \$1,000,000 is used up, then any loss above that amount will be paid over by the state to the trustees. Any such amount paid by the state is assessed upon the cities and towns in which the lines are operated in proportion to the number of persons in such cities and towns using the service at the time the payments are made by the state. If, in later years, receipts exceed the cost of service, any amount in the reserve fund in excess of the \$1,000,000 with which it was started is paid over by the state to be repaid to the cities and towns until any assessments have been repaid. Thereafter, any such excess remains in the reserve fund until needed to meet the cost of service. Fares are then to be reduced as described above.

These are terms that have been stated many times before. Sight should not be lost of them in any study which is made of the mass of data contained in the report of the trustees as presented to the Legislature.

Under the conditions that prevail at Boston it was no ordinary performance on the part of the management that resulted in the showing of \$502,195 in 1925 as the balance of receipts above the cost of service compared with a deficit of \$636,696 for 1924. In fact, the more one studies all the circumstances the more is the truth borne home that the residents of Boston are the real subjects for congratulation.

Staggered Hours Again Proposed to Relieve New York Transit Situation

RELIEF from the almost intolerable conditions on the rapid transit lines of New York is proposed by the Health Commissioner and the head of the Transit Commission through the adoption of the staggering of working hours. The plan was proposed in Washington and in New York during the war, and was actually put in practice for a short period in each city. Its use was abandoned, largely because the workers had not accustomed themselves to the adjustments necessary in their daily routine. In Washington it is said that the difficulty of obtaining negro maids who would prepare breakfast at several different periods had much to do with the disfavor into which the plan fell.

Outside of the transportation industry, it is not generally realized that peak-load conditions have become much worse during the past few years. Evidence to this effect is readily available, however. Study of the load curves of a number of the large electric generating stations illustrates in a striking way the change that has taken place. Between 1920 and 1925 there has been a marked improvement in the load factors of stations which supply no railway power, while in the case of generating stations serving the electric railways the load factor has become worse during this period.

Undoubtedly the present situation is a serious one. Congestion in the streets, overcrowding of transportation vehicles, excessive investment cost for equipment needed only in rush hours and uneconomic use of power station facilities all indicate the imperative need for some form of relief. Staggered working hours will afford a measure of such relief if the public is willing to accept this solution of the problem.

Reduction in Hours of Labor Has Increased Rush-Hour Congestion

ACCENTUATION of the sharpness of the rush-hour peak demands on the urban transportation systems is due in a considerable part to reduction in the hours of labor. The time for starting work has been set later, so that the executives, clerks and laborers begin and end their business day more nearly at the same time. This has meant that to carry the people on the transportation systems additional equipment has had to be put in service as far as possible. Beyond that, overcrowding has been the only way out.

Shifting of the hours of work slightly will make it possible for the transportation companies to give better service than under present conditions. If the spread of working hours is over only a limited period, the plan will tend to increase rather than to decrease the cost of rush-hour service, as the maximum loads per vehicle will be reduced. Real relief can be obtained if

the hours can be spread sufficiently so that the cars and trains can make more than a single round trip during the rush hour, which is all the most of them can make under present conditions. In case enough spread in the peak can be obtained so that two or more trips can be made it will mean that much better service can be provided at a cost no greater than the present. It will mean that construction of rapid transit lines, now sadly behind due to the policies of ex-Mayor Hylan, will be given a chance to catch up with the growth in population.

The same plan can be used to advantage in any city where there are sharp rush-hour peaks. As a means of getting more transportation it has such merit that, barring the construction of new lines, it warrants serious consideration.

Detroit Will Pay for Its Cars Out of Earnings

INTEREST in the suggestion of H. U. Wallace, general manager of the municipal railway at Detroit, Mich., to acquire 300 more new cars and 150 new buses goes beyond the proposal itself. True, that suggestion reflects the growth of the demand for transportation, but it is his remarks about the inadvisability of keeping old cars in service that show the modern trend in selling transportation. The information available does not indicate the age of the equipment which Mr. Wallace would replace. It would be interesting to know that. Of greater significance is the fact that the department at Detroit has been assured it will be able to secure new cars and buses, on terms that will permit it to pay for all of the cars out of earnings or out of the savings that the department will be able to make in the cost of operating the new, light, modern rolling stock as compared with the present heavy and obsolete units.

Mr. Wallace is not given to making rash statements or to holding out promises that are not likely to be fulfilled. His task at Detroit is a difficult one. He knows that. If other evidence of his ability correctly to diagnose the needs of Detroit were needed it is furnished in the paper presented by him before the Highway Engineering Congress at Ann Arbor on Feb. 17, a digest of which is published elsewhere in this issue. That shows his grasp of the general situation. More recently, however, he went on record with respect to the need for up-to-date rolling stock before the North End Business Men's Association. He knows what the public wants. As the disposition of the Board of Street Railway Commissioners is favorable to his proposal the riders of Detroit will probably get what they want. Not only that, they will apparently get it on terms and conditions that should appeal to the railways elsewhere confronted with similar problems of providing adequate rolling stock, some of which have heretofore been loath to believe that the plan which he has in mind was workable.

The Detroit proposal is, of course, not new. Its sponsors would not claim credit for that. But the credit is theirs of putting the matter before the public in its present light and of being prepared to subject the matter to the acid test of daily experience. The equipment trust obligation, in which the cost of new equipment is amortized over the years out of earnings, is an old device, but resort to it has been all too infrequent in the electric railway field.

Depreciation as an Operating Expense

FIRST ARTICLE

Definition of the Problem—Service Life Is Difficult to Determine, and on This the Whole Structure Rests—Illustrations Given to Show Several Viewpoints—Creation of a Depreciation Reserve Is Vitally Important

By W. H. Maltbie

Late General Counsel United Railways & Electric Company
of Baltimore

THE interstate commerce act, as amended Feb. 28, 1920, contains in Sec. 20, paragraph 5, a direction to the Interstate Commerce Commission to determine for all carriers subject to the act the classes of property for which depreciation charges might properly be included under operating expenses and the percentages of depreciation that should be charged with respect to each such class of property with power to the commission to classify carriers for this purpose and thereafter, if necessary, to modify these items. The act further provides that carriers subject to the act shall not charge to operating expenses depreciation on any classes of property except those included by the commission or charge for any class of property a percentage of depreciation other than that prescribed by the commission.

There is some dispute as to the real intent of this section of the law. Some hold that Congress was fearful lest certain railroads should use their previous freedom as to the setting up of depreciation reserves as a means of absorbing income which would otherwise be subject to recapture, and passed the section in question solely with a view of preventing overcharges for depreciation. Under this interpretation of the act the charging of depreciation upon any particular class of property is optional with the company, but if charged it can be only upon those classes of property which the commission has selected, and at the rate which the commission has fixed.

Others hold that it is the intent of the act that the Interstate Commerce Commission should set up classes of depreciable property and fix percentages for each class, and that thereafter carriers subject to the act shall set up depreciation at the fixed percentages upon all property classed as depreciable.

In carrying out the provisions of the act the Interstate Commerce Commission has created a depreciation

SOME months ago, as the result of a conversation with one of the editors of this paper, the author undertook to prepare a series of articles on the subject of depreciation. This series was looked forward to with great interest, as Mr. Maltbie was an outstanding authority on the subjects of valuation and depreciation. After his death, the manuscript was located and forwarded to this paper through the kindness of J. H. Hanna, chairman of the A.E.R.A. committee on national relations sub-committee on depreciation, of which Mr. Maltbie was a member.

These articles were written from the viewpoint of the present investigation by the Interstate Commerce Commission of the whole subject of depreciation of electric railway property. This investigation was undertaken with a view to establishing definite rules and regulations covering the allowance of charges for depreciation as an operating expense on all roads subject to its jurisdiction. Since there is a possibility that any regulations of this sort established by the I. C. C. may be accepted as a precedent by various state commissions it is important that all street railway executives should be familiar with the present situation.

These three articles, dealing respectively with causes of depreciation, methods of setting up funds to provide for depreciation and practical methods of building up a retirement reserve, constitute a valuable contribution to the literature on the subject. They were probably the last creative work of the author.—EDITOR.

section in its Bureau of Accounts and instructed this section to make a study of depreciation for each class of carrier subject to the act and prepare a report to the commission which will be made the subject of subsequent testimony, brief and argument.

Reports upon carriers by water, telephone companies and steam railroads have already been prepared and filed by the depreciation section, and the study of electric railway property is now in progress. No decision has been handed down by the Interstate Commerce Commission in any of these cases.

While the depreciation section, of course, is not compelled to follow in its electric railway report the precedents established in its other reports, the reports already published indicate the general point of view of the section.

The American Electric Railway Association has undertaken to give the Interstate Commerce Commission the fullest possible co-operation, and with that end in view has created a sub-committee of the committee on national relations to handle the problem, with J. H. Hanna of the Capital Traction Company, Washington, D. C., as chairman, and on the recommendation of this sub-committee employed the writer as its attorney to study the collected information, prepare the case for the association and submit it to the Interstate Commerce Commission.

DEPRECIATION A TWOFOLD PROBLEM

The problem is so complex and the information already furnished to the commission and the association indicates such a wide divergence of views, and in some cases such a complete misunderstanding of the situation, that it seems wise to accept the invitation of the JOURNAL and attempt to clarify matters by a discussion of the problem now under consideration.

Depreciation is in reality two distinct problems. The

difference between them will perhaps be more clearly understood by considering the executive who has bought a new car and confining our attention for the moment to the single car. It is a reasonably safe bet that at some future date that car will be retired and replaced by a new one. When that time comes the company should have at hand a sum equal to the cost of the retired car, accumulated during the life of the car. A determination of the annual contribution to this retirement fund is therefore nothing more than the simple operation of dividing the cost of the car by the number of years of its service life.

But what is its service life? It may go out at any time through an accident; it may wear out at some future date, which may be almost indefinitely deferred by proper maintenance or hastened by lack of proper care; a change in the art may make it so uneconomical a unit to operate as to force its retirement; it may no longer meet with the approval of public taste; or it may become inadequate on account of its speed or loading limitations and be retired for that reason. No matter how skilled and experienced the executive, his answer to the question is a guess, based upon a consideration of those causes which tend to shorten and those causes which tend to lengthen the useful life of the car in question.

The executive, if he is wise and his revenues will stand the strain, having made his guess as to the service life of his one car, will deliberately shorten it in order to protect himself in case its ultimate retirement comes earlier than he anticipates. Even then, if he is dealing with a single car, he is liable to lose a large part of his investment, since it is impossible to accumulate a reserve with sufficient speed to protect the owner against all possibilities of accidental destruction.

DEPRECIATION MUST BE TREATED AS AN OPERATING CHARGE

The annual payment into this reserve will be treated as an operating charge, and the problem which the executive has now solved is the problem of depreciation as an operating expense.

Now let us assume that ten years have elapsed and that the executive desires to know the value of the car, which has not yet been retired. His problem is: "How much is the car worth to me; how much will I take for it and purchase a new car?" And the answer to the question is to be found in a comparison of the expected life of the car as it stands with the expected life of a new car replacing it. The original life expectancy was a guess based upon an estimate of the length of life till retirement through accident, the length of life till retirement through obsolescence, the length of life till retirement through wear, and the length of life till retirement through inadequacy. Ten years have elapsed, but withdrawal through accident is no nearer than it was ten years before. If the art has been changing, retirement through obsolescence may be at the very door; if the art has not been changing, it is probable that the life until obsolescence retirement estimated today will be as long as the life estimated ten years before.

The danger from removal through inadequacy may be as indefinite as it was ten years before, may be much greater, or may even be more remote. The amount of remaining wearing life depends on the present condition of the car. It would seem evident, therefore, that the question of the present value of the car

cannot be answered merely by a computation based upon the executive's original guess as to service life and the elapsed period of ten years.

A SECOND ILLUSTRATION

The distinction will perhaps be clearer if we use more definite quantities in our illustration. Let us assume that the car in question was a double-truck, four-motor equipment with a seating capacity of 40, and that the company operated an interurban line connecting a number of smaller communities with a larger center, but had no urban division. The executive, on the basis of his own experience and such information as he can collect elsewhere, decides that in the long run, so far as mere wear is concerned, cars may, with proper care and maintenance, be kept in active operation for a period of 50 years. Therefore his protection demands an annual appropriation of 2 per cent. He is one of those who believe that the gradual progress of the art will continue and that passenger cars in general will become obsolete after 20 years. Protection from this demands an annual appropriation of 5 per cent. Finally, believing that his central city is about to develop as a manufacturing center to which the smaller communities which he serves will become suburban areas, he reaches the conclusion that within ten years this car will become inadequate and must be replaced either by cars of larger capacity or by multiple-unit trains. He therefore, for this reason, assigns a ten-year life and sets up a reserve of 10 per cent annually.

Since the reserve for inadequacy will provide the entire cost of the car before either obsolescence or use demand its removal, the latter elements are entirely ignored, and the depreciation reserve of 10 per cent set up on account of inadequacy is the sole reserve set up, and the service life is estimated, therefore, at its minimum figure of ten years.

Now that the ten years have elapsed, however, the car would have, if original conditions had continued and the original estimates been correct, no value except scrap or resale. As a matter of fact, however, the executive's expectations as to the development of his central city as a manufacturing area have not been realized. Instead, it has developed as a jobbing and educational center. His 40-seat unit passenger car is as adequate today as when it was first installed, and there is practically no probability that it will ever become inadequate. Moreover, the executive has acquired in the ten-year period an urban division, and therefore if the inadequacy should by any chance occur, he is prepared to shift this car to meet the constantly increasing demand for urban service. It is, therefore, so far as inadequacy is concerned, just exactly as valuable as it was at the beginning of the ten-year period.

So far as obsolescence is concerned he finds that the manufacturer is still building the same car and selling it, and that he himself, if he desired to, increase his service with new cars, would probably buy identical equipment with that which he already operates. He still believes that in the long run cars will go out through obsolescence in an average of 20 years, but there is certainly no difference, so far as obsolescence is concerned, between this car and the new cars which are being turned out by the factory, and therefore, if he assumes that this car has lost half of its value because ten years of the assumed 20-year life have elapsed, he is driven to the ridiculous conclusion that

new cars coming from the factory are worth only half what they cost.

So far as wear is concerned, while he anticipated 50 years of usefulness, the car may actually have done better or worse than he anticipated, and the only thing to do is to examine it and determine whether or not it has probably more or less than 40 years of life remaining.

Suppose that on examination he finds that it is wearing about as he expected. He has then a car which will presumably wear for 40 years; is probably good, so far as obsolescence is concerned, for 20 years, and is in no danger of inadequacy. Its probable service life, at the end of the ten years originally estimated, is therefore 20 years, and the car for which a reserve of the full difference between cost and resale value has been accumulated bids fair to render the same service, and therefore to be as valuable, as a new car.

In other words, present-day value is not to be measured by elapsed life, or by the deduction of the existing reserve from the present value. In the words of one of our federal courts, depreciation reserves "represent what observation and experience suggested as likely to happen, . . . with some margin over . . . The law requires deduction only for actual depreciation, just as actual as the present value, and the extent of that depreciation must be ascertained by the same kind of evidence; in the last analysis opinion based on contemporary investigation." U. S. District Court, Southern District, New York, *New York Telephone Co. vs. Prendergast*. Rate Research Vol. 25, No. 11, page 165.

The pending case before the Interstate Commerce Commission is related entirely to the first of these two depreciation question, namely, how much shall street railway companies set up year by year as a reserve with which to care for the retirement of property?

The answer to this general question involves the answer to several subordinate questions which we will now consider.

WHAT PROPERTY NEEDS A RESERVE?

First—For what property shall a reserve be created?

The obvious answer to the question is to create a reserve for all property which must eventually be retired and to make the reserve equal to the difference between the original cost and the value of the property when retired. In other words, there will be no reserve created for land; very nearly 100 per cent reserve for cars which it is expected will be retired through obsolescence or wear, since scrap value is small, and a smaller reserve for a car which it is anticipated will be retired at an early date through inadequacy, since the resale value of such a car may be considerable.

The answer to the question is not, however, so simple as it seems. Consider the trackage of a large steam railroad system. It is obviously impossible to set up a depreciation reserve for each rail or each tie. Rails and ties wear out, however, and are, as they wear, replaced from year to year. But, as a matter of fact, current repairs and current maintenance leave the system, generally speaking, with the same or a greater value at the end of each calendar year than it had at the beginning. It is true that the appropriation might be made to the depreciation reserve year by year, and the amount expended for rails and ties entered as charges against this reserve, but on a large diversified system the annual charges would approximately equal the annual appropriation, and the only practical result of the application

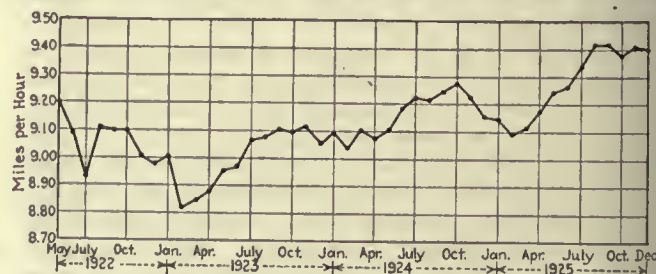
of the depreciation theory to this trackage is a complication of the accounting requirements of the company. Considerations such as these have led the Interstate Commerce Commission, in its dealings both with the steam and with the electric lines, to make it optional with the carrier as to whether a depreciation account shall be set up for trackage; have led the depreciation section of the Interstate Commerce Commission, in its recommendations with regard to steam roads, to suggest that no depreciation reserve be set up for rails, ties and track construction, and have led the Treasury Department, through the Income Tax Division, to refuse to make any allowance for depreciation on track structure.

While this ruling is entirely satisfactory to the larger electric railway systems, which, because of their age and large total mileage, do approximately the same amount of track reconstruction work each year, it is not satisfactory to the smaller companies, and particularly to the smaller companies of recent origin. These smaller companies may run for several years without any important reconstruction program, and then be compelled to reconstruct a large percentage of their entire trackage, or, as in a case recently presented to the Income Tax Division, a new road may find itself at the end of its first life cycle compelled to face practically a 100 per cent track reconstruction program.

It is obvious that a heavy burden of this sort cannot be absorbed by operating expenses of a single year, and good business dictates that a company which foresees an expense of this sort shall accumulate out of earnings an adequate reserve.

Operating Speed Increased at Detroit

DURING the year 1925 the Department of Street Railways, City of Detroit, increased the operating speed of its cars from 9.10 m.p.h. in February to a maximum of 9.42 m.p.h. in August and September. During the fall months there was a slight retrogression. The increase in average speed is attributed by H. U. Wallace, general manager, to the electrification of switches, which were formerly manually operated; widening of certain streets and the work of the Mayor's traffic committee, which has brought about many improvements in traffic regulations. Moreover, 90 cars



Operating Speed by Months of the Department of Street Railways, City of Detroit

which formerly used storage air were equipped with compressors. Birney cars, which were formerly operated on some of the principal streets of the city, have been removed and are now used in outlying districts. It is felt by the management that a continuation of the present program will make possible a general average speed of about 10 m.p.h. The operating speed of the Department of Street Railways is shown in an accompanying chart by months from May, 1922, to November, 1925.

Pleasing appearance of passenger stations has helped to build up traffic on the Chicago, Aurora & Elgin Railroad. This shows a Chicago limited train at Wheaton



From Receivership to Prosperity in Three Years

FIRST ARTICLE

Development of Territory, Reconstruction of Track and Operation of New Cars on the Chicago, Aurora & Elgin Railroad Have Increased Transportation Revenue 65 per Cent in Three Years—Fares Are Higher on Electric Line than on Competing Steam Roads

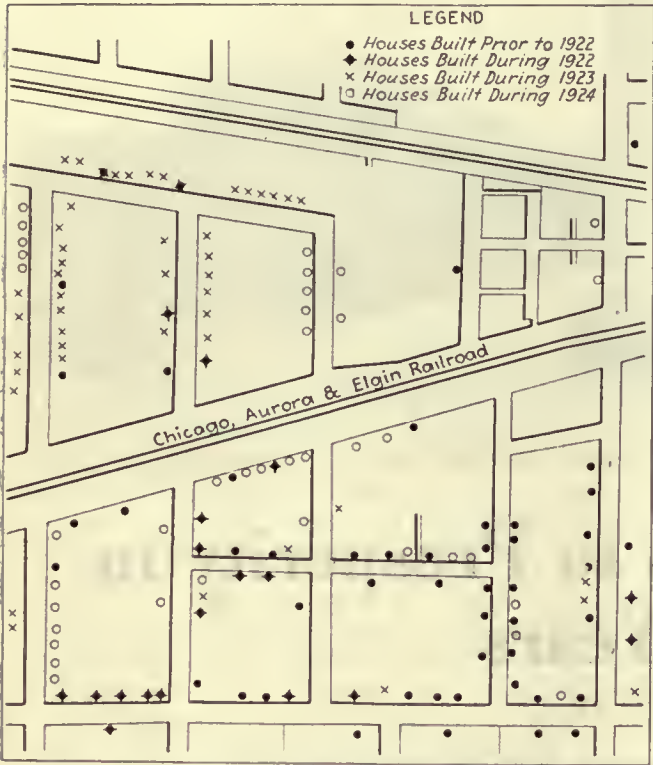
FROM out the wreck of the receivership of the Aurora, Elgin & Chicago Railroad a new company was born in the summer of 1922 and has forged ahead rapidly since that time. The plan of reorganization was formulated by Dr. Thomas Conway, Jr., who became president of the new company, known as the Chicago, Aurora & Elgin Railroad. While considerable work had been done during the receivership to improve the physical condition of the property, it was far from being up to the standard desired by the new management. An extensive program of rehabilitation was undertaken immediately, including the reballasting of the line from Wheaton to Chicago, a distance of 25 miles; purchase of new passenger and freight equipment, construction of additional substations and improvements to passenger stations along all its lines. The resulting substantial increase in traffic has fully justified the expenditure of \$1,500,000 for these improvements. The story of the development of traffic is told in this issue. Details of the track reconstruction, new rolling stock, improvements in power facilities and the development of a profitable freight business will be told in future articles in this paper.

At the time the Conway management assumed control, the property was dependent mainly upon the through business between Chicago and the five terminal

cities located in the Fox River Valley, Aurora, Elgin, Batavia, Geneva and St. Charles. No sustained attention had been given to the development of the intermediate territory. The Aurora-Elgin property, as it is called, is faced with competition as keen as any to be found in the United States. The territory through which it runs is served also by the suburban lines of the Chicago & Northwestern, the Chicago, Burlington & Quincy, the Illinois Central and the Chicago, Milwaukee & St. Paul railroads, which render suburban service of the first quality, both as regards comfort and frequency. The traveling public has a free choice of using either steam or electric service, depending upon which seems most attractive. The new management decided that a rehabilitated and modernized electric railway had certain advantages, which if properly exploited would enable it to command a fair share of the competitive business. The plans, however, did not contemplate building up the Aurora-Elgin property solely by taking traffic away from the steam railroads. The objective of the new management was primarily the upbuilding of the territory served, thus creating more traffic and simultaneously increasing the prosperity of the railway and the various communities.

As soon as the work of physical rehabilitation of the property has been sufficiently advanced to constitute a

self-evident demonstration of the good faith of the new management and of its ability to carry out its promises, Dr. Conway called together all the real estate dealers and municipal officials of the several communities served by the railway, to acquaint them at first hand with the plans of the new company and enlist their support in a co-operative effort to build up the territory adjacent to the company's lines. He pointed out that in the decade



Section of Permanent Record Map Showing Houses Built Each Year Since Reorganization of the Railway

which ended in 1920 the population of the city of Chicago had increased 23.6 per cent, while the population of the suburban belt, known as Metropolitan Chicago, increased 76 per cent. The Chicago, Aurora & Elgin Railroad territory did not receive its share of the growth which occurred, because none of these suburban communities on the line showed an increase in population of as much as 76 per cent. Opportunity existed, he said, not only to attract a proportionate share of the future growth of the suburban belt but also to catch up and secure a part of the growth which should have occurred from 1910 to 1920.

Close and cordial relations were established between the management and the real estate interests and municipal officials. For the purpose of assisting in the suburban development, the Chicago, Aurora & Elgin Railroad put into effect a system of homeseekers' tickets, sold in lots of 100 to real estate agents, at rates approximately equal to the 25-ride ticket rate applicable to the same point, which averages between 1.4 cents and 1.5 cents per mile, depending upon the distance from Chicago. In a short time all of the real estate dealers in the territory were purchasing these tickets and distributing them to prospective home buyers to enable them to make inspection of the property which the dealers had to sell.

The railway believed that this ticket would not only assist in attracting people to the territory but it would also introduce them to the Aurora-Elgin service, which, if it proved acceptable, would win the new settler as a regular patron. It soon became apparent from a study of the development of the territory and the traffic of the property that the use of homeseekers' tickets constituted an almost exact index of the rate at which lots and homes were being sold. The accompanying chart shows graphically the collection (not sale) of these tickets by months from July, 1922, to the end of 1925.

From the beginning the company has given the closest attention to the rate of development of its territory, by periodically making a comprehensive and detailed survey of the situation. In July, 1922, a few days after the new management assumed control, instructions were given to the engineering department to make a detailed survey of the entire suburban territory to furnish a basis for future comparisons. The results of a house-to-house field canvass were plotted upon permanent maps, thus furnishing a permanent record of all buildings then constructed within a distance of 1 to 1½ miles on either side of the company's lines, the distance depending upon the degree to which the road might expect to attract traffic in competition with other transportation agencies. A similar field canvass was made in December, 1922. Observers were furnished with photostat copies of the original map showing the results of the July canvass, with instructions to indicate thereon all new houses. Similar checks, the results of which were compiled in like fashion, were made in December, 1923; in December, 1924, and in June and December, 1925. A portion of a typical office map showing all houses constructed in a section of the town of Villa Park from 1922 to 1924 is shown in another column.

Records of this kind have proved useful in estimating growth in traffic, in planning schedules and future cap-

COMPARATIVE INCOME STATEMENT FOR TWELVE-MONTH PERIOD ENDED JUNE 30, 1922, AND FOR CALENDAR YEARS 1922, 1923, 1924 AND 1925, CHICAGO, AURORA & ELGIN RAILROAD

	1925	1924	1923	1922	Twelve Months Ended June 30, 1922	% Inc. 1925 Over 12-Mos. Period Ended June 30, 1922	% Inc. 1925 Over 1924
Gross revenue railway operations.....	\$2,707,616.91	\$2,315,638.45	\$2,184,121.93	\$1,910,472.11	\$1,632,815.50	65.8	16.9
Railway operating expenses, including maintenance, rentals and general taxes.....	2,061,442.35	1,813,374.03	1,722,795.35	1,569,197.24	1,378,859.72	49.5	13.67
Net railway operating revenue.....	\$646,174.56	\$502,264.42	\$461,326.58	\$341,274.87	\$253,955.78	154.4	28.6
Net operating revenue from the sale of power (exclusive of power sold to Chicago Suburban Power & Light Company, included above).....		1,356.38	94,823.31	107,179.17	113,598.92		
Other income.....	30,444.57	16,820.42	8,703.76	280.57	127.44		
Total income.....	\$676,619.13	\$520,441.22	\$564,853.65	\$448,734.61	\$367,682.14	84.0	30.0
Interest on bonds and other interest and deductions	191,653.06	203,839.21	165,414.02	126,381.75	120,430.44	59.1	
Balance available for depreciation, amortization and surplus...	\$484,966.07	\$416,602.01	\$399,439.63	\$322,352.86	\$247,251.70	96.1	53.1
Appropriation to renewal and replacement reserve.....	165,000.00	165,000.00	165,000.00	121,924.65	120,764.67		
Balance.....	\$319,966.07	\$151,602.01	\$234,439.63	\$200,428.21	\$126,487.03	153.0	111.0

ital requirements, particularly as regards the need for additional substation capacity, rolling stock, shop facilities, etc., in outlining the annual program for crossing protection, in determining what new station facilities are required, in keeping track of the progress of real estate development and in determining whether the company was receiving its proportionate share of the growth of the business in each community.

The tabulation on page 360 shows the tremendous progress which has been made during the last four years in the development of the suburban community between Wheaton and Chicago on the main line of the Chicago, Aurora & Elgin. The per cent increase in the number of houses in each suburban town for each year over the number of houses in existence at the end of the preceding year is given.

Perusal of this tabulation shows that the increase in the number of houses in the various suburban communities from July 1, 1922, to Dec. 31, 1925, has ranged from 53 per cent to 379 per cent. Through the territory as a whole, the average increase in the number of houses within the area tributary to the lines of the Chicago, Aurora & Elgin Railroad over the 3½-year period has been 136 per cent.

In consequence of the close co-operation established between the real estate developers and the management, it has been possible regularly to secure from many of the former the names and addresses of home buyers about to settle in the territory. These prospective customers have been promptly added to the mailing list of the Aurora-Elgin and effective publicity literature has been sent to them. The advantages of the electric service and ticket rates prevailing have been called to the attention of the new residents at or shortly after the time they move into the community.

All ticket agents are required to report monthly the names of persons who for the first time have appeared on their records as purchasers of commutation tickets. A personal letter is written by J. H. McClure, general manager, to each new commuter, welcoming him as a patron of the company, expressing the hope that he will find the service satisfactory and that if he has any complaints or suggestions to make he will do the company the favor of giving it the benefit of his opinion. This letter also calls attention to the ten and 25-ride tickets sold by the company and their uses and advantages to the other members of the family. It has been found that these letters give a personal touch to the relationship between the management and the new commuters, as evidenced by hundreds of letters written by the recipients of such communications and many valuable suggestions that have been made by them.

Ticket agents of the company are also required to report each month the names of all commuters who purchased tickets in the preceding month, but who do not appear in the records as having purchased monthly tickets for the period in question. A representative of

the transportation department is immediately assigned personally to interview these individuals and to report results of this interview to the general manager. Many discourtesies or lapses in service have been brought to

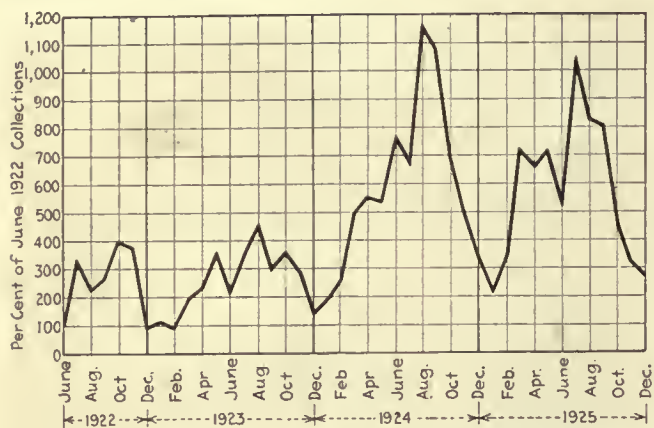


Suburban Territory Served by the Aurora-Elgin Lines. Shaded Areas of Communities Between Wheaton and Chicago Are Developments of Past 3½ Years

the attention of the general manager. In a large majority of these cases, personal interviews resulted in ironing out the irritations of passengers and in winning back the business temporarily lost. The knowledge that every passenger who discontinued the use of the line would be interviewed by a representative of the management and a written report made thereon has had a salutary effect in promoting uniform courtesy and thoughtfulness on the part of the trainmen.

Unlike many electric railways whose fares are lower than those of competing steam carriers, the rates on the Chicago, Aurora & Elgin Railroad between Chicago and most of the suburban towns were substantially higher than those which prevailed upon the lines of its competitors before the increase made by the latter in December, 1925. The ten-ride ticket rates prevailing between Maywood and Wheaton on the one hand and Chicago on the other have ranged from 15 per cent to 35 per cent higher than those on the steam lines. The 25-ride ticket rate has been from 28 per cent to 35 per cent higher than similar rates on the steam lines.

It was believed by the management that if a superior standard of service could be established business would be attracted to the electric railway at higher rates than those charged by its competitors. Moreover, it has been well known for years that the steam railroads operating out of Chicago were running suburban service at a loss. The present management of the Aurora-Elgin decided



Collection of Homeseekers' Tickets Has Been Found to Be an Accurate Index of the Development of the Suburban Territory Served by the Railway

that traffic to be worth while must pay reasonable rates, and it therefore determined not to inaugurate any new fares at the ruinous figures prevailing upon the steam lines. Faith in the ability of good service to attract patronage has been justified by the fact that railway operating revenues have increased more than 65 per cent in three years, while railway operating expenses, including maintenance, rentals and general taxes, in-

cent bond issue provides funds for the retirement of the 7 per cent, series A, refunding and improvement bonds issued at the time of the reorganization, and also for an issue of \$750,000 in two-year, 6½ per cent notes sold in December, 1924. It provides also a substantial amount of new capital for additions and betterments to be made in the near future. Provision is made for future necessary junior financing through the creation of a prior preferred stock issue and the issuance at this time of \$500,000 of such stock.

Municipalities through which this road operates have been growing so rapidly that frequent schedule changes have been necessary in order that adequate service should be furnished. A new schedule has recently been completed which calls for 221 passenger trains per day, divided into three different classes, limited, express and local. This is a slight increase over the previous winter schedule and provides a headway varying from ten minutes to 30 minutes during the entire day for municipalities within a distance of 26 miles of the Loop district of Chicago. Such service enables patrons living in Wheaton, a distance of 25 miles from the Loop district of Chicago, to reach their destinations within the same time or in even less time than they would be able to were they living in certain parts of the city of Chicago.

Running time between Wheaton and Chicago is 45



Well-Maintained Rock-Ballasted Track Permits High-Speed Operation

creased only 49½ per cent. Net earnings from railway operations have increased more than 154 per cent in 3½ years. Percentages of total traffic handled by the Aurora-Elgin from various towns, passenger revenue by month and a summary of revenues and expenses by year are shown in accompanying tables.

The company has recently marketed successfully a \$5,000,000 bond issue, involving the purchase in the open market of more than 90 per cent of an underlying bond issue secured by a closed non-callable mortgage. The old bonds were deposited under a new first and refunding mortgage. The new \$5,000,000 25-year, 6 per

minutes on limited trains and one hour on local trains. The intervening municipalities are reached in proportionally less time. During the morning and evening rush hours this schedule provides for limited trains every twenty minutes, or less, between Chicago and the western terminals of Aurora, Elgin, Geneva, St. Charles and Batavia, and an hourly limited service to each western terminal the balance of the day. Elgin is more than 41 miles from the Chicago terminal and the total running time of the fastest trains from Chicago to Elgin is 65 minutes. Twenty-six minutes is consumed in going out over the elevated structure to the end of

INCREASE IN HOUSES, IN TOWNS AND VILLAGES CONTIGUOUS TO THE CHICAGO, AURORA & ELGIN RAILROAD, WHEATON TO MAYWOOD							Boarding or Alighting at		Percentage of Total Traffic Handled by the Aurora-Elgin	
	Wheaton, Per Cent	Glen Ellyn, Per Cent	Lombard, Per Cent	Villa Park and Ardmore, Per Cent	West to Stratford Hills, Per Cent	Elmhurst to Elgin, Per Cent	Total, Per Cent		1922	1925
1922 over 1921.....	14.5	24.5	24.9	43.5	19.8	19.3	22.2	Elgin.....	59.8	69.2
1923 over 1922.....	9.1	18.4	22.1	52.3	19.3	20.0	20.0	Geneva.....	25.9	40.1
1924 over 1923.....	7.3	19.2	27.2	52.8	23.2	22.4	22.4	Wheaton.....	39.9	61.0
1925 over 1924.....	14.4	32.2	32.8	43.7	41.3	31.3	31.3	Glen Ellyn.....	48.2	57.3
Cumulative 1925 over 1921.	53	133	157	379	148	136	136	Lombard.....	55.2	68.6
								Elmhurst.....	16.3	32.8



Attractive Brick Station at Chicago Golf Club on the Aurora Branch

joint operation at Forest Park, a distance of 9 miles. The remaining 32 miles is run in 39 minutes, including stops to take on and discharge passengers at Lombard, Wheaton and Glen Ellyn.

In spite of these most difficult operating standards an analysis shows that of the total number of trains operated under the present schedule, approximately 100 per cent depart from their terminals on time, and that 95 per cent of them arrive at their destinations on time or less than three minutes late.

Below is a list showing the number of trains operating between Chicago and the larger municipalities along the road:

Stations Between	Milea from Chicago	Number of Trains
Maywood and Chicago.....	11	95
Bellwood.....	13	90
Berkley.....	14	90
Elmhurst.....	16	91
Villa Park.....	18	86
Lombard.....	20	141
Glen Ellyn.....	23	143
Wheaton.....	26	144
Geneva.....	37	34
St. Charles.....	40	34
Batavia.....	40	50
Aurora.....	40	52
Elgin.....	42	49

Wheaton, Glen Ellyn and Lombard enjoy service which provides 71 trains daily to the Chicago Loop and 73 trains outbound daily from the Loop, this service being operated from 5:45 to 1:30 a.m. Thirty-eight of the 73 trains are fast expresses. In the rush hours these communities enjoy a service approximating a 7½-minute headway. At the east end of the Aurora-Elgin line, where there is a convergence of

the fast high-speed limited trains from the Fox River terminal cities, the Wheaton expresses and the Elmhurst short service there now is a train on the average of every 3½ minutes in the direction of heaviest travel, these trains ranging in length from two to six cars each.

Trains operating into and out of the Wells Street Terminal, Chicago, are made up of two to six cars each. In cases where more than six cars are operated, the trains are run in sections, due to the present platform limitations in Chicago. During the summer months, in addition to the regular scheduled trains,

excursions ranging from 60 to 120 cars each are operated between Chicago and the park owned and operated by the company in the Fox River Valley.

The company has capitalized its natural advantages in popularizing its service. In its advertising literature it has continuously featured "No Smoke, No Dust, No Cinders" and has constantly called to the attention of the people in the communities served the remarkable accessibility of its Chicago terminal as compared with those of the steam railroads and the ability of passengers to change under cover and without walking up or down stairs from Aurora-Elgin trains to elevated trains, taking them to any department store or most business establishments or places of amusements in the Loop district of Chicago without setting foot in the street.



Six-Car All-Steel Limited Trains Operated on the Main Line Are Run in Three-Car Sections on Aurora and Elgin Branches

RECORD OF PASSENGER REVENUES BY MONTHS				
	1922	1923	1924	1925
January.....		\$126,988.58	\$132,643.25	\$149,011.26
February.....		109,022.48	125,600.91	133,259.93
March.....		122,951.70	137,172.30	143,676.82
April.....		131,406.62	140,052.71	149,478.47
May.....		155,092.68	164,222.16	175,388.65
June.....		158,081.20	158,236.75	173,140.55
July.....	\$163,599.29	174,809.50	173,981.65	179,920.47
August.....	164,427.63	176,490.23	177,800.94	187,382.04
September.....	145,037.74	158,908.83	159,934.14	166,787.56
October.....	139,147.59	143,694.39	154,521.47	160,552.54
November.....	130,709.52	140,849.78	151,930.52	164,335.84
December.....	138,223.80	146,716.09	152,008.65	168,641.72
Totals.....	\$881,145.57	\$1,745,012.08	\$1,828,075.45	\$1,951,575.85

Great emphasis has been placed upon the cleanliness of the cars, keeping the seats in first class repair and condition, spotless toilets and other like features demanded by a discriminating public.

STATIONS HAVE BEEN MODERNIZED

The management has carried out a program of thorough rehabilitation and modernization of its terminal stations in Aurora, Batavia, Geneva, St. Charles and Elgin and has painted and put into first class condition all other passenger stations. Lately a new brick station has been built at Seventeenth Avenue, Maywood, and the company is now constructing an artistic passenger station at Glen Ellyn.

These are the more important principles evolved and applied by the management in building up the passenger traffic of the property. The faith shown in the ability of an electric railway to hold its own in competition with steam railroads of the highest class when the most modern type of facilities are provided and modern methods of operation and improvements in service are employed has been strikingly justified.

Railway Turns Tables on Auto Dealers

SOME time ago the Mobile Light & Railroad Company published an advertisement in the local papers calling attention to the expense of using private automobiles for business and the economy of street car riding. An article by R. S. Kellogg, secretary of the News Print Service Bureau, published in the *Nation's Business* was quoted showing automobile operating costs, as follows:

	Car 1	Car 2	Car 3
Cost of car	\$792.90	\$1,379.74	\$2,238.22
Mileage	14,000	13,494	33,100
Years used	2.5	3.18	3.71
Depreciation per mile, cents..	3.0	4.9	5.0
Repairs, upkeep, etc., per mile	2.6	4.7	2.0
Tires per mile	2.0	2.4	1.9
Insurance, licenses, etc., per mile	1.5	2.4	1.5
Gasoline	1.5	1.9	1.0
Garage	.4	1.7	1.0
Total, cents	11.0	18.0	12.5

Ford dealers in Mobile came back at the railway with an advertisement stating that a Ford can be operated for 3.92 cents per mile. This figure was arrived at by the following calculation:

Fire and theft insurance.....	\$12.00
Liability and property damage insurance.....	29.40
License	12.00
Taxes	12.00
Tires	84.00
Gasoline	201.60
Oil	39.60
Mechanical and oiling	72.00
Battery	13.80
Depreciation	125.40
Total operating cost	\$601.80
Miles run	15,120
Cost per mile, cents	3.92

Not to be outdone, the railway retorted:

We challenge the statement that the depreciation on a Ford car was only \$125 for 15,120 miles, or \$0.0082 + per mile. At that rate a Ford car would run approximately 62,445 miles before scrapping.

The depreciation on a car is the difference between original cost and the amount received for the car after use.

We advise all owners of Ford cars to take their cars to a Ford agent, after they have run their cars 15,120 miles, and show the agent his ad in the *Register* of Oct. 31, 1925, and demand a new car, turning the old car in at original cost of \$516.35 less \$125.40 depreciation, they to receive \$390.95 for the old car. The agent will do this, because he advertises the depreciation is only \$125.40 on a Ford for 15,120 miles.

The result of the controversy was that the automobile dealers were overrun with people demanding an exchange at the figure mentioned in the advertisement. This they were not prepared to do and consequently were compelled to acknowledge their mistake in publishing the figures.

Parking Restrictions Speed Up Cars and Aid Retail Trade

CHECKS made by the research department of the Pittsburgh Railways show that there has been a substantial reduction in the running time of street cars since the new parking restrictions have been in effect in the downtown district. Detailed information concerning these regulations was published in *ELECTRIC RAILWAY JOURNAL* for May 30, 1925, page 847. Time saved by cars routed over various loops is shown in the accompanying table.

TIME SAVED BY CARS ROUTED OVER VARIOUS LOOPS		
Loop Number	Number of Cars During Maximum Hour	Average Decrease in Time, Minutes
1	26	1:01
2	84	2:47
3	81	3:51
4	27	5:21
5	57	2:55
6	23	:25
7	20	:56
8	52	:35
9	159	3:17

It is significant also that retail trade in the downtown district has prospered more than that in the outlying sections since the change was made. Comparisons are given below of the buying power of the Pittsburgh district, as represented by bank payrolls in 1924 and 1925; retail sales for the entire district and downtown sales, as represented by seven large department stores.

Retail Trade			
Three Months Ended	Buying Power, Per Cent	Entire District, Per Cent	Downtown, Per Cent
March 31	—9.01	—1.87	—2.53
June 30	—1.77	—5.90	—2.37
Sept. 30	—3.67	—6.20	—2.77
Dec. 31	—8.13	+1.50	+3.47
Year	—5.72	—2.80	—0.80

Industrial depression resulted in a slight decrease in buying power and trade, but the decrease in the downtown section, 0.8 per cent, was much less than that of the district as a whole, which was 2.8 per cent. The fear expressed by some downtown merchants that their business would be injured by the stringent parking regulations appears to have been without foundation.

Earnings of the Pittsburgh Railways decreased 1.67 per cent as compared with a decrease of 5.72 per cent in buying power for the district.

Impressions of European Tramways

Conditions and Practices in Several Continental Cities Indicate that in Some Essential Things, Such as Courtesy, the Europeans Excel—Short Four-Wheeled Cars Are Standard Nearly Everywhere, but Operation Is Almost Noiseless—Few Abandonments of Tramway Lines Noted, but the Bus Is a Factor in Extensions

By James A. Emery

Vice-President Ford, Bacon & Davis, Inc., New York



The Royal Exchange, London, a Heavy Traffic Point. Tramways Do Not Operate in This Part of the Business District

CITY transportation systems abroad appear to be in much better shape than other lines of industry. On the Continent, particularly, tramway cars are noticeably crowded; that is, carrying many standing passengers, even during off hours. The general condition of the physical property is good. Cars are clean and well painted, and track, with a few exceptions, is excellent. The large traffic volume can probably be ascribed to the movement of population from country to city that has taken place since the war in spite of unemployment. The physical condition is undoubtedly due to good habits of maintenance, high standards of design and cheap labor.

It is hardly likely, notwithstanding good appearances, that the tramway lines are generally prosperous, as fares are very low measured by our standards, for rides of average length. In a large proportion of European cities the tramways are owned and operated

Mr. Emery's observations were made on a somewhat hasty pleasure trip through England, Belgium, Holland, western and southern Germany, Austria, Italy, Switzerland and France. No attempt was made to study the urban transportation situation, so that only such matters are covered as naturally attract the notice of one interested in the business.

—EDITOR

by the municipalities, so that the necessity of paying all expenses and a satisfactory return on the investment is not so urgent as with private companies.

The zone system of fares is very common, and as the platforms are open the conductor is a busy man. He wears a little satchel or

wallet for his tickets and change and gives every passenger a punched ticket or receipt, which, however, is not collected when the passenger leaves the car. In Vienna, and probably in some other cities, a monthly pass is sold for about \$3.25 (U. S. equivalent).

It is probably in part due to the zone fare system that the use of one-man cars has not been attempted to any great extent.

In England the traffic is noticeably lighter than on the Continent, but municipal systems, particularly in London, seem to be operating more service than the volume of traffic warrants. This may be due to the unemployment situation. The London tramways are

said to be hardly earning their working (operating) expenses.

Tramways are not permitted in the inner or principal business sections of London and Paris.

To an American the prevalence of narrow gage track is interesting. Perhaps two out of every three systems are narrow gage, 3 ft. in Great Britain and 1 m. (39.38 in.) on the Continent. Narrow grooved rail is universally used in paved streets. The substructure is integral or identical with the paving base, and the rails are held by steel ties or cast-iron chairs imbedded in the concrete base and spaced about 5 ft. apart. Heavy flat tie rods are used and no joint welding was observed, although it is understood that welding has been practiced to some extent. As the wheel loads are light this construction preserves its line and surface for a long time, and if it goes bad, repairs are made at once so that there is very little rough track or paving in evidence.

Overhead wires are kept in first-class shape. Nothing is used but steel or iron for poles and structural or built-up poles are common. Concrete protection for poles around the base is often seen. Sliding contacts are used almost altogether on the Continent instead of

together with operation in very narrow streets, would seem to look bad for the accident account, but it is probably not as important with them as it would be with us. In some streets the rail cannot be more than 3 ft. from the building line. Street traffic even in London is nothing like as great a problem as it is with us, because automobiles have not come into such general use. In Rome, for example, a city of 900,000 population, there are very few traffic policemen. Pedestrians seem to be more wary than here, for automobiles and taxicabs go tearing through the narrow streets tooting their horns most urgently, but nothing happens.

Next to their standards of maintenance the most important particular in which European tramways excel ours is in route signs. All routes are numbered. The numbers show in big figures on the signs and are so well advertised that every one is familiar with them. In addition, the destination and generally the principal streets operated on are named on the outside signs. Inside, the complete route and rates of fare are conspicuously displayed. In the subways each car carries several large cards showing the line diagrammatically with every station and transfer point. In the subway stations the signs are so complete that it is not neces-



Suspended Railway Running from Vohwinkel to Barmen in the Rhine District of Germany

trolley wheels. In the zones immediately surrounding the inner sections of London and Paris there is much slot construction, and in Paris the slot is formed along the inner side of one of the running rails.

Short four-wheeled cars are standard nearly everywhere on the Continent, with a notable exception in Paris, and in the larger cities they are operated in trains all day long with one motor car and from one to three trailers. Some of the trailers are very light with very small wheels and low floors. In Great Britain double-deck cars are used on all the larger systems. The stairs lead up from the rear platform and the upper deck is inclosed. On the Continent they have a fancy for delicate colors. Such colors would be fantastic in our cities, but in the clean, picturesque European streets they are rather pleasing and not at all out of place. Of course it is necessary to keep such paint clean, and the paint and varnish must be well looked after. The finish often looks like a furniture job.

Compared with American operation, the cars are almost noiseless. While much of the credit for this is due the track, yet it speaks for close fits and frequent tightening of all truck parts and for close attention to gears and pinions.

There are no inclosed platforms on city cars. This,

sary for the stranger to ask a single question. Folders and small scale maps are widely distributed describing the routes in detail and giving directions for reaching all points of interest. The routes are so well advertised that the public, particularly hotel people and policemen, are surprisingly familiar with them. In London and Paris stopping points are indicated by neat, distinctive signs.

On the Continent buses are not used to any extent, except in the largest cities. This is probably due to municipal operation of so many tramways and to lack of funds. In England bus lines are fairly common in the principal cities, but do not seem to be permitted to poach on the tramways to the extent that they have done in London.

Of much interest to an electric railway man is the extensive program of electrification of steam railway lines that is in progress. A large portion of the suburban service around London and Paris has been electrified, and in Switzerland and the mountain districts of Italy where coal is dear and water power plentiful much work is going on.

Tramway men acknowledge that future extensions of service will have to be provided for by buses as the cost of tramway construction is prohibitive as compared with bus installation.

There has been very little abandonment of tramway lines and no cases of bus substitution came to notice.

The suspended railway (Schwebebahn) running from Vohwinkel through Elberfeld to Barmen in the lower Rhine country is a novel and interesting system of transit. The cars are suspended by gooseneck hangers from a single rail, there being two hangers per car, each attached with motor to a two-wheel truck. The rails are carried by latticed trusses running longitudinally and hung on cross-frames shaped like an inverted U or V. The line is about 6 miles long and the greater part of it is located over the Wupper River, a small stream from 100 to 120 ft. wide. The river bed is very crooked so that the railway alignment is a succession of curves. This, together with the frequent stations, results in a rather low average rate of speed. There is an intensive industrial development all along the line, so that two-car trains were well filled on five-minute headway during off-peak hours.

This suspended railway has been in operation for over 25 years, so that its practicability is well proved. It is much less costly to build than an elevated railway of standard type and makes comparatively little obstruction. It has favorable operating features in point of comfort, quietness and minimum stair climbing. In view of the apparent success of this system, from a technical standpoint, and its several advantages, it seems singular that it has not been used or seriously considered in many cities where rapid transit is needed but where the traffic is not heavy enough to support a subway or elevated line of standard type.

While definite conclusions can hardly be drawn from "horseback" observations, it seems fairly clear that European tramways are far ahead of American in car signs, advertising, maintenance standards and courtesy of operatives. They have made a quicker "comeback" since the war than other industries so far as volume is concerned, but in spite of this they are not earning cost of service, so that a part of their support must be coming out of general local taxes. Future extensions will be taken care of by buses. Municipal operation is apparently efficient under European conditions in so far as quality of service is concerned.

Wages on European Electric Railways

WAGES paid to motormen and conductors on the tramways in Europe are far less than those prevalent in this country. Statistics giving information up to date on European wages were presented in a report at a meeting held in Brussels in July, 1925, of the personnel connected with European tramway companies. This report gives for all the principal European countries the average hours per week or per day of the employees in the transportation and maintenance service, with wages paid, accident and sick benefits awarded, and other similar information.

In Great Britain a motorman is paid somewhat more than a conductor and averages, according to the size of the city, from \$12.84 to \$15.24 a week. These wages are based on a standard week of from 48 to 52 hours. The conductors get about a dollar less per week. These statistics are taken from the reports of 142 tramway systems, of which 90 are municipally owned and 52 under private operation. The tramways in Great Britain employ more than 50,000 persons, of whom 12,620 are employed in London.

In Holland there are nine tramway systems, of which five are municipal, and the transportation employees in Holland earn from 30 to 40 kronen a week, or from \$12 to \$16. They work from eight to eleven hours per day.

In Italy the wages are considerably lower. For transportation employees they average 780 lire, or about \$28 per month, and the men work from 8½ to twelve hours a day. Italy has 44 city tramway systems, with about 30,000 employees.

In Sweden the wages of the men seem to be as high as anywhere in Europe. That country has eleven tramway enterprises, of which eight are municipal, and 2,402 men are employed. Forty-eight hours a week is the standard period of work and the wages average from \$54.67 a month in the small towns to \$72.36 in Stockholm. After about twelve years of service a man in the small town can work up to a monthly wage of \$67.80, while the motorman in Stockholm can expect \$89.80 a month after twelve years of service.

There is only one railway system in Alsace-Lorraine, that in Strassburg. The men make from \$21.18 to \$24.75 per month. Married men get \$2.50 more a month, as well as 75 cents a month extra for each child under fifteen years. Overtime is paid at the rate of 14 cents an hour before midnight and 24 cents an hour after 12 p.m.

Accident Record Good in St. Louis

ACCIDENTS for the year 1925 on the lines of the United Railways, St. Louis, numbered 19,171, which is the lowest figure of the last four years. Of this total 10,775, or 56.2 per cent, were collisions with other vehicles. This, the largest class of accidents, has grown steadily from 323 in 1907 to a maximum of 12,609 in 1923. Starting organized safety work in 1924, the company was able to check the increase and accomplish substantial decreases in 1924 and 1925. This has been done despite the fact that the number of motor vehicles in St. Louis has increased from 80,556 in 1923 to approximately 150,000 at the present time. Except for the item of collisions with motor vehicles, the accident record of the railway for 1925 is the lowest in the nineteen years, beginning with 1907, for which records are available. All other accidents total 8,396, as compared with a maximum of 22,167 in 1909.

Accidents for the past year are classified as follows:

Type of Accidents	Number
Collisions with wagons	444
Collisions with persons	531
Collisions with animals	41
Car collisions	270
Car derailments	130
Boarding and alighting	2,046
Falls in car	951
Disturbances	534
Car equipment failures	42
Miscellaneous	1,966
Transportation employees injured	115
Power plant and line employees injured	216
Maintenance of way injuries	419
Shop injuries	307
Electrolysis	31
Struck by car doors	353

Fatal accidents in which the United Railways was involved numbered 31. The low record of fatalities occurred in 1920 with 25, and the high record in 1910 with 70. Car-miles numbered 2,465 and passengers carried 23,831 per transportation accident in 1925. Per passenger injury, the car-miles averaged 11,542 and the number of passengers carried 111,595.

Association News & Discussions

Diesel-Electric Locomotives Discussed in Joint New York Meeting

SOMEWHAT conflicting views were presented at the meeting held in New York on Feb. 18 when the Metropolitan Sections of the four great engineering societies—civil, electrical, mechanical and mining and metallurgical—met to discuss the Diesel engine and its effect on heavy traction. This is not strange because the Diesel locomotive is a newcomer in the railroad field.

C. A. Stein, general manager Central Railroad of New Jersey, was the first speaker. Progress of the steam locomotive was depicted in stating that the present locomotives are 34 times as heavy and 52 times as efficient as the first 8-ton, 2,000-lb. tractive effort locomotives used in the United States in 1829, almost 100 years ago. For the first 70 years the railroads expanded and grew in size, but made few changes in the design of the steam engine used for propelling the locomotive. Since 1900, however, many improvements have been made, until now almost too many things are placed on the locomotive. Mr. Stein inferred that the steam locomotive has almost reached the limit of its development.

The speaker mentioned several objections to electrification, the first and principal one being its high cost. He feels also that there is a danger in the third rail and the high voltage overhead trolley. Sleet and ice have proved a real interference to third rail operation and also, to some extent, to overhead trolley. Troubles at the power house and on the transmission lines cripple electric operation of the entire zone rather than of one unit only. While the thermal efficiency of the electric engine is greater than that of the steam locomotive, he believes that it is not as efficient as the Diesel engine. The Diesel engine undoubtedly will find an important place in steam road operation, particularly in terminals, whether electrified or not, until one standard system of railway electrification can be determined upon.

The Central Railroad of New Jersey is operating one Diesel locomotive in its Bronx terminal. It is self-contained, requiring no heavy investment to provide for peak conditions. One unit is just as efficient as it would be if Diesel locomotives were used throughout. In other words, a changeover from steam to Diesel engine can be made gradually, as conditions warrant.

High grade mechanics are not necessary in Diesel engine maintenance, according to the speaker. In common with electrification, the steam road is freed of water tanks, cooling stations, water scoops, ash-handling equipment and other similar necessities to steam locomotives. This one Diesel locomotive

operating in the Bronx yards has a fuel cost of only one-fifth that of the steam locomotive it replaced, because on account of smoke reduction the steam locomotive had been burning anthracite at \$8 a ton. Mr. Stein feels that the Diesel-electric or oil-electric locomotive is going to find a very definite place in steam road operation and will be a considerable competitor to electrification.

Hart Cooke, of the McIntosh-Seymour Corporation, stated the case for the Diesel locomotive. Mr. Cooke's paper is abstracted elsewhere in this issue.

ELECTRIFICATION FAVORED BY MR. STORER

N. W. Storer, general engineer Westinghouse Electric & Manufacturing Company, delivered an outstanding paper in favor of electrification. Mr. Storer's paper will be found elsewhere in this issue.

Edward B. Katté, chief engineer electric traction New York Central Railroad, read into the records a few remarks, reproduced elsewhere, and showed several tractive effort curves of the freight and the passenger Diesel locomotives designed for the New York Central, in comparison with steam locomotives. These are the first Diesel locomotives used in this country for road service.

W. B. Potter, chief engineer railway department, General Electric Company, in a brief discussion, said that the electrical engineer must think of electrification in the terms of transportation. The speaker has long been interested in both electrification and internal combustion engines, and while he believes that the Diesel locomotive will find an important place in steam road operation, because of its high thermal efficiency, he sees no fear for heavy electrification of trunk lines because of this unit. Mr. Potter looks forward to the future of steam road operation as being capable of absorbing all of these forms of locomotion in their proper place.

Sidney Withington, electrical engineer New York, New Haven & Hartford Railroad, rose to the defense of the electrical operation of his road between New York and New Haven, saying that its reliability had been greater than under steam locomotive conditions, despite the dependability upon a power station and transmission line. Also, he is not alarmed as to the personal injury possibilities mentioned by one of the other speakers, saying that it is only a matter of education to warn people of the dangers of the third rail and the high-tension trolley. During the shopmen's strike a few years ago it was a very significant fact that the

electric locomotives were better maintained by the unskilled labor available than were the steam locomotives, an important point in favor of electric locomotive operation.

Mr. Withington said that the system of electrical operation should be standardized, particularly in the East, where the steam roads of one company come in contact with others so frequently that it would be an annoyance and an expense if many of these other roads were electrified by different systems.

Even in the congested districts in New York the sum of all rated power of the New Haven electric locomotives is four times the capacity of the power house, indicating clearly the effect of the diversity factor. Diesel locomotives would be more expensive, not only because of the greater expense of the Diesel engine per horsepower, but because it would be necessary to supply so much more generating capacity than would be possible under full electrification operated from central power stations. Likewise, the future oil supply may seriously affect the economic status of the Diesel engine in the future, in the opinion of Mr. Withington.

W. S. Murray said that the final answer was an economic one, and that the annual charge composed of the two factors, one of operating and the other of fixed charges, must determine the usefulness of any type of locomotion. He has little fear for electrification as a whole, but sees an opportunity to use the Diesel engine in yards, branch lines, and perhaps on road work on long light lines that do not require heavy trains and are not encumbered by heavy grades.

Several others discussed various points that were raised by the speakers. The entire meeting showed a great interest in the subject and a desire for some type of engine to replace the steam locomotive under conditions that are not favorable to its operation and maintenance.

The Diesel Locomotive Must Prove Itself*

BY E. B. KATTÉ

Chief Engineer Electric Traction
New York Central Railroad

SUCH a locomotive as the Diesel should promote the extension of heavy electric traction in that it may be considered a competitor of the electric locomotive in certain fields, and as such, should tend to reduce the cost of electric locomotives.

The most promising field for the Diesel locomotive is in switching service in non-electrified yards, or between yards operated under different systems of electrification; also on railroads

*Abstract of discussion before a joint meeting of A.S.C.E., A.S.M.E., A.I.E.E., and A.I.M.&M.E., New York City, Feb. 19, 1926.

with relatively infrequent service, or on branch lines where the traffic is not heavy enough to provide an operating saving sufficiently large to cover the increased fixed charges incident to electrification. To compete successfully in either of these fields the Diesel locomotive must operate practically noiselessly and smokelessly; the economy in operation must at least equal that of the electric locomotive and the first cost must be less than the combined cost of the electric locomotive and the working conductors.

During the preliminary exposition of the advantages of the Diesel locomotive, railroad engineers have accepted without argument the first three requirements, knowing that the contract trials will demonstrate their truth or fallacy. With regard to the ultimate cost of the unit there is still grave question. The prices thus far quoted are excessive, considering the small capacities offered. It is only in the hope that prices will be very materially reduced when Diesel locomotives are built on a mass production basis that railroad engi-

capable of developing about 1,000 hp. As a result of their activity two orders have been placed for Diesel-electric road locomotives. The one for passenger service will contain an 800-hp. McIntosh-Seymour engine. The weight of this locomotive is about 148 tons. It is intended for light passenger service on the main line of the Putnam division. The freight road locomotive will weight about 128 tons, and the power will be furnished by a 750-hp. Ingersoll-Rand engine.

Tractive effort and speed characteristics of these locomotives, and of the steam locomotives which they are intended to supplant, have been plotted to the same scale and are shown on the curve reproduced elsewhere. Both the passenger and the freight locomotives will be equipped with four General Electric motors, each having a continuous rating of 266 hp. The locomotives will be arranged for multiple-unit operation, two or more being coupled together for hauling heavier trains.

The speed of the passenger locomotive

acteristics of the different types of motive power and take up the requirements of some of the special kinds of railway service, so that we may see what the special conditions are and what motive power would be best suited for the service.

The tractive effort curve has a maximum value which is limited by the weight on the driving wheels. This total weight on the driving wheels is limited by the axle loads permissible for any given track structure and also the number of driving wheels which can be used. A steam locomotive will maintain this maximum tractive effort practically constant up to about 10 m.p.h. Then the tractive effort falls off approximately inversely as the speed, approaching a hyperbola which is limited by the horsepower which can be developed by the cylinders and the boiler capacity of the locomotive. With this form of tractive effort curve the locomotive can pull at considerable speed any load which it can start. Full horsepower capacity is only developed at relatively high speeds.

As a matter of reference we will refer to the weight, first cost, fuel cost and time the engine is in service of the steam locomotive as 100.

The Diesel-electric locomotive has the important peculiarity of being able to develop its full horsepower at any speed, and this with the even torque of the electric motor gives very high tractive effort at starting. The weight of the locomotive is such that practically all of this can be utilized.

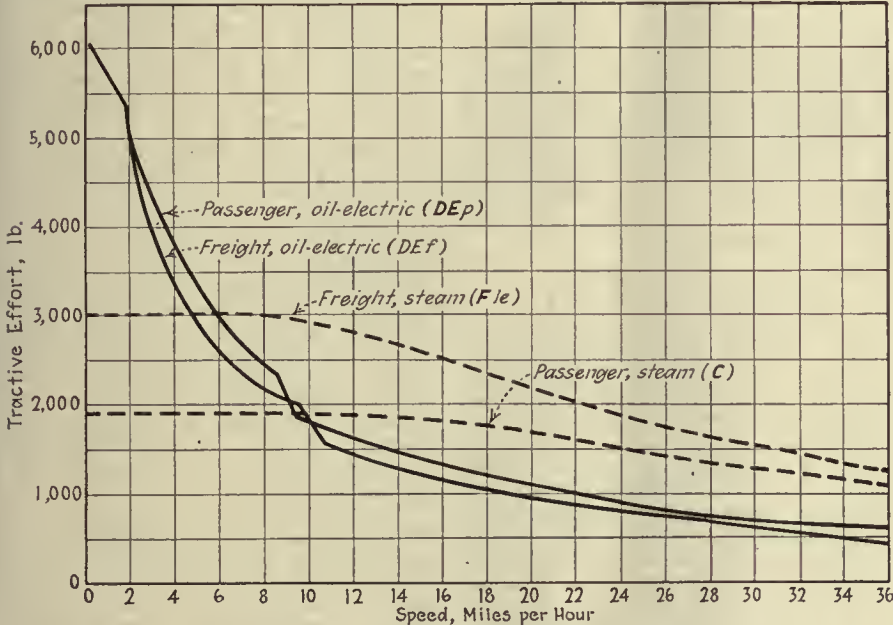
The tractive effort of a Diesel-electric locomotive varies in general inversely as the speed, the curve being approximately a hyperbola equivalent to the net horsepower that the locomotive is able to deliver. This gives the locomotive ability to start very easily any load it can draw at a reasonable speed and this large tractive effort at starting also gives high accelerations. In regard to weight, the Diesel-electric locomotive will weigh about 50 per cent more per horsepower than the steam locomotive; say we will represent this by 150. The cost per horsepower will be in the neighborhood of three to four times as much as the steam locomotive, which we will represent as 300 to 400.

In regard to maximum output, this type of locomotive can be arranged for multiple-unit control, so any amount of output desired can be provided.

With this type of locomotive the fuel and water necessary for a great many miles can be carried on the locomotive so that no tender is required. With the same relative leeway as used for the steam locomotive, and allowing for the absence of standby losses for the Diesel locomotive, we find that the fuel cost will be represented by 30.

Because of the freedom from operating delays and those caused by servicing and maintenance, the time in active service of a Diesel locomotive would be represented by 200, about twice what is usual with a steam locomotive.

On the same basis the electric locomotive would have a weight per horsepower equivalent to 75 as compared to steam, a cost of 300 to 600, depending upon the power station requirements; a fuel cost of 37 and a time in actual service equivalent to 225.



Comparison of Tractive Effort, New York Central Steam and Oil-Electric Locomotives

neers have been able to recommend the trial orders thus far awarded.

Like all other railroad problems this is one of economics. There is no question but there is a field for the Diesel locomotive adjacent to and bordering those fields now occupied by the steam locomotive and the electric locomotive, but its economic advantage over both must be firmly established before the railroads can invest very heavily in this new type.

Thus far the principal development of Diesel locomotives in this country has been for switching, in relatively small sizes. Such a locomotive was tested by the New York Central Railroad during the summer of 1924. These tests were very encouraging but clearly indicated that a locomotive of greater capacity was desirable.

Since that time the engineers of the New York Central have diligently endeavored to interest manufacturers in the production of an oil-electric locomotive weighing about 100 tons and

hauling average trains on the Putnam division will be between 15 and 50 m.p.h., depending upon the weight of the train. The maximum safe running speed of this locomotive light will be 60 m.p.h. The freight locomotive is designed to haul the average weight trains on the Putnam division between 8 and 35 m.p.h., with a maximum safe speed of 45 m.p.h.

Effect of Diesel-Electric on Railroad Electrification*

By HARTE COOKE
McIntosh-Seymour Corporation

PROBABLY the best way to get an idea of the effect of Diesel-electric locomotives on the electrification of steam railways is to look into the char-

*Abstract of discussion before a joint meeting of A.S.C.E., A. S.M.E., A.I.E.E. and A. I. M. & M. E., New York City, Feb. 19, 1926.

From a detailed analysis of the various fields in which the Diesel locomotive might be used we conclude that for very light traffic the freight and through passenger traffic can best be handled by the steam locomotive and the local passenger traffic by gas rail cars to keep the capital expenditure to a minimum, as the traffic is not heavy enough to allow the savings accruing from the more economical operation of Diesel-electric locomotives or full electrification to balance the increased capital cost.

As traffic increases, changed conditions should be carefully analyzed to see when the steam locomotive should be supplemented by Diesel-electric, the Diesel-electric making the best showing when it can operate the most miles per day.

The capital cost for full electrification is variable and becomes less as the traffic density increases. It is a rugged arrangement and can give much service at a low fuel cost if used in heavy traffic. Under these conditions the capital costs are reduced to an amount which the fuel saving justifies.

The Diesel-electric has an important difference from full electrification in that the investment can be made gradually and the benefits obtained at once and in proportion to the extent to which it is used.

All of the above shows that the three kinds of motive power are supplementary:

For light traffic, steam.

For heavier traffic, Diesel-electric.

For very dense traffic, full electrification.

Some Features of the Diesel-Electric Locomotive*

BY N. W. STORER

General Engineer Westinghouse Electric & Manufacturing Company

RAILWAY people the world over show a tremendous and widespread interest in the Diesel-electric locomotive. This is simply indicative of the need for a locomotive which, while having all the advantages of steam as an independent motive power unit, avoids many of its disadvantages. The Diesel electric avoids much of the smoke, dirt and noise, the frequent trips to the roundhouse for attention to fires and boilers, and for fuel and water. It has four times the thermal efficiency of the steam locomotive and adds to that all the flexibility and easy control of the electric.

The steam locomotive is one of the greatest machines in the world but the interest aroused by the Diesel electric shows how anxious the railways are to get something better, how thoroughly everyone has come to believe that it is only a question of time when it will be superseded. Whether the Diesel engine is to displace it is another matter.

After the engine itself the great problem is the transmission of the energy developed to the driving wheels. Direct mechanical connection is more or less satisfactory for very small outputs, the hydraulic with a little larger capacity; and a combination of the two is being exploited in Europe. Practically everyone in this country who is working on a locomotive to be operated with the Diesel engine is using the electric system of transmission, indicating that there are serious limitations to the mechanical and hydraulic systems and that the great superiority of the electric is generally accepted. On the face of the matter, it would seem that a direct connection between the engine and the drivers would be the simplest and most efficient, but since the Diesel engine is not self-starting and does not operate satisfactorily at very low speeds, a direct connection is impracticable and any mechanical or hydraulic means,

while possibly satisfactory and reasonably efficient when new, will continually develop troubles and will lose its efficiency with age. The electric transmission system, while admittedly being more or less expensive and heavy, is extremely simple to operate, absolutely flexible in its speed-torque characteristics and maintains the same efficiency throughout its life.

SIMILARITY OF DIESEL ELECTRIC TO MOTOR-GENERATOR TYPE

The Diesel-electric locomotive is very similar in its characteristics, performance and equipment to the motor-generator type of alternating-current locomotive which takes power from a single-phase trolley and utilizes a synchronous motor to drive a direct-current generator which furnishes current for the driving motors. The Diesel electric substitutes the engine with its auxiliaries for the synchronous motor, transformer and all other parts of the equipment pertaining to them. The equipment, from and including the direct-current generator to the motors, is or may be practically the same. Speed regulation is by voltage control of the generator in both cases. The motors for both are low-voltage, direct-current series machines, with all of their rugged characteristics. The main difference between the Diesel electric and the motor-generator type is that the output of the former is limited to a very definite value which may be carried for long periods, while the synchronous motor, which the same continuous rating, has a great power house back of it and may carry very heavy overloads for short periods. The Diesel electric in this respect has almost the same limitation as the steam locomotive. Its horsepower capacity is limited. It can exert the same maximum tractive effort as the all-electric because of the motor drive, but only at very low speeds.

On a Diesel-electric locomotive, the generator and motors must be considered as a unit in calculating the output of the locomotive. The most

important features of the electrical equipment are:

1. The ability to utilize the full capacity of the engine at whatever train speed it is needed or desired.

2. A high efficiency so as to transmit the maximum amount of energy from the engine to the wheels.

3. Simplicity of control.

4. Light weight.

What are the characteristics of the electrical equipment that will best utilize the engine capacity? Voltage control of the generator has already been mentioned as giving the maximum flexibility for control of speed and tractive effort. This, however, is operative only up to the normal voltage of the generator and over most of the range while overloading the motors and generator. Over-voltages are sometimes secured by forcing the generator field. Where the voltage is limited, as is necessarily the case with a generator designed for a definite voltage, further speed control may be secured by weakening the fields of the motors, and there is no reason why a very considerable range of speed cannot be covered in this way. Difficulties from commutation of the motor at weak fields and high speed might be serious with motors taking current from a trolley with all its fluctuations and surges in voltage, but it is much less serious where the power plant goes with the motors. It must be remembered that neither generator nor motor is overloaded while operating with weak fields on the motors.

The efficiency of the electrical equipment is of the utmost importance, not simply on account of the fuel consumption, but because the higher the efficiency the greater will be the energy of the locomotive available at the wheels. Every effort should be made to make it as high as possible. The electrical equipment, when properly designed, will have an excellent all-day efficiency.

With all of the complications of the Diesel engine and its auxiliaries to contend with, it is all the more necessary to have a simple electrical control system. There are a number of ways to secure this feature. The one most commonly used provides an automatic control of the generator voltage which limits the output of the generator to the capacity of the engine so that the engine is in no danger of being stalled. This is usually combined with engine speed control. It is very desirable with the Diesel engine to keep the speed as low as possible for the output that is required, as low speed means lower maintenance, and especially lower consumption of lubricating oil, which is usually one of the most expensive items of operation. It is fortunate that this idea of variable engine speed combines very readily with a good control system for the electrical units of the power plant.

The auxiliaries on a Diesel-electric locomotive are like the auxiliaries on other kinds of locomotives—very important and very annoying. The Diesel engine requires pumps for water circulation and for lubrication. It requires air filters and radiators with a thorough ventilating system for cooling the engine. There must be ample

*Abstract of discussion before a joint meeting of A.S.C.E., A.S.M.E., A.I.E.E. and A.I.M.&M.E., New York City, Feb. 19, 1926.

capacity of air compressors for the brakes and control. These are preferably driven electrically, either from the main generator or from an auxiliary supply system. Means must be provided for starting the engine. This is a matter of the greatest importance, since if the engine cannot be started, it is useless. It is usually started by compressed air, a pressure of from 200 to 500 lb. being necessary. In some cases the engine is started by current from a storage battery using the generator as a motor. Of course, a comparatively small amount of control equipment for the electrical apparatus will be necessary, but the sum total of the auxiliary equipment amounts to quite a large proportion. Last, but not least, is a good supply of fuel, oil and water.

WEIGHTS OF DIESEL LOCOMOTIVES ARE HIGH

Diesel locomotives that have been built thus far range in weight per horsepower from 207 lb., which was in practically the first locomotive built, to 400 lb. The largest one built in this country to date, the 1,000-hp. Diesel electric built by the Baldwin Locomotive Works, with electrical equipment manufactured by the Westinghouse Electric & Manufacturing Company, weighs 275 lb. per horsepower. It is probable that it will be some time before locomotives weighing less than 200 lb. per horsepower can be built regularly with Diesel electric equipments.

Therefore, when I give 200 lb. per horsepower as the low limit for the Diesel-electric locomotive, I give a figure which has never yet been attained and which will require all of the ingenuity and refinements available to secure. For the present, it is much safer to figure on a weight of 250 to 300 lb.

THE FIELD OF THE DIESEL-ELECTRIC

Is the Diesel-electric locomotive going to displace all of the steam locomotives and eliminate the electric from further consideration? It is quite unnecessary for anyone in the steam or electric locomotive business to be alarmed at this time. Samuel M. Vauclain has said that much time will elapse and many millions of dollars be expended to develop the Diesel-electric locomotive to a point where it will figure to any great extent in transportation service. While Mr. Vauclain is probably right so far as trunk-line service is concerned, it undoubtedly will have a definite field in transportation circles. The first and probably the most important field will be on branch lines of railroads in service such as the Canadian National Railways is handling with its Diesel-electric cars. Switching is a most desirable place for the Diesel electric. The ordinary steam switchers used around buildings are a great nuisance on account of the noise, smoke and dirt which they disseminate. They are also expensive to maintain. The Diesel-electric eliminates a great part of the nuisance, is able to stay on the job for many hours at a time and probably will require little maintenance when it is taken to the roundhouse. These features, together with

COMING MEETINGS OF *Electric Railway and Allied Associations*

March 5—Metropolitan Section, A.E.R.A., 29 West 39th Street, New York, N. Y.

March 8-11—National Railway Appliance Association, annual exhibition, Coliseum and Annex, Chicago, Ill.

March 9-11—Oklahoma Utilities Association, annual convention, Mayo Hotel, Tulsa, Okla.

March 12—Pennsylvania Street Railway Association, annual meeting, William Penn Hotel, Pittsburgh, Pa.

March 17-18—Central Electric Traffic Association, Portage Hotel, Akron, Ohio.

March 17-18—Illinois Electric Railways Association, Illinois State Electric Association and Illinois Gas Association, annual joint convention, Springfield, Ill.

March 23-25—National Conference on Street and Highway Safety, Washington, D. C.

April 13-16—Southwestern Public Service Association, Galveston, Tex.

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

June 28-July 2—Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

Oct. 4-8—American Electric Railway Association, annual convention, location not yet determined.

the flexibility of the electric transmission and the fuel economy, make it a most desirable successor to the steam locomotive. It is preferable in some situations in large cities to the electric switcher, since it eliminates the necessity for the overhead wires or third rail which are extremely difficult to apply in and around buildings and represent a high investment from which little return is possible.

The Diesel-electric will probably find a certain field in main-line service, especially for low-speed freight haulage, where the weight per horsepower is no particular disadvantage. It will be particularly useful in this respect on branch lines where the traffic is comparatively light. Further than this, no one can speak with any degree of certainty at this time, but in general it is not probable that it will be used to any extent for other than low-speed traffic for some years to come.

There is one point concerning it which cannot be too often emphasized; its use does not eliminate the fundamental limitation of the steam locomotive, namely, that its power is limited to the amount that can be generated on the locomotive itself, while the electric always has all the power it can utilize.

ELECTRIFICATION

Electrification will go forward in terminals and on the railways having heavy traffic where the investment in

overhead lines and substations does not represent a considerable part of the cost of electrification. The Diesel-electric and the straight electric locomotive will move side by side in improving the transportation of the railways of the world. The steam locomotive will still roll along for many years, as it has advantages which are hard to overcome. It must be understood, however, that the steam locomotive is not the simple machine it once was. The improvements which have so greatly increased its capacity and efficiency have made it a very complicated machine and one which is most difficult to maintain. These are the reasons which will ultimately compel the retirement of a large part of them in favor either of the all-electric, the Diesel-electric or some other independent type of locomotive.

Track Saturation Problem in Detroit*

BY COL. H. U. WALLACE

General Manager Department of Street Railways, City of Detroit

DETROIT has much in common with other large cities in its transportation problems, but it also has many problems which are peculiar to itself and are perhaps unique in the urban traction field. The intensive industrial life of the city not only lengthens the peak periods but increases the customary two periods to three distinct periods, with some three or four semi-peak hours in the intervals.

The city extends along the north bank of the Detroit River for a distance of approximately 12 miles and is solidly built up from the river in a generally northwesterly direction to a depth of about 9 miles. It is nearly rectangular in shape. The business center is on the city's southerly edge, approximately in the center of its river frontage, extending about $\frac{3}{4}$ mile along the riverfront and about the same distance inland.

One line of railroads enters the city in the southwesterly corner and extends diagonally across it from the business center. A second line of railroads extends from the westerly limits of the city, running southeasterly in a diagonal line to the business center. In addition to these, a belt line extends around the city approximately 6 miles from the center. Naturally the manufacturing district follows very closely along these railroads, which brings this district in an approximate semi-circle 3 miles from the business section, while some of the larger plants lie in a circle from 5 to 6 miles from the center of the city.

Our traffic surveys indicate that the majority of our people live on the side of the city opposite to which they work; that is, people engaged in plants on the westerly side of the city live on the easterly side, and vice versa, thus making it necessary for them to travel across the city to get to their work.

Many of the industrial plants work either two or three eight-hour shifts

*Abstract of a paper presented at twelfth annual conference on highway engineering, Ann Arbor, Mich., Feb. 17.

per day, employing thousands of men. There are probably very few railway systems in the world outside of Detroit that have a peak hour between 11 p.m. and 1 a.m. This peak is followed by the usual morning peak period from 6 to 9 to the business and industrial centers, and another in the afternoon from 3 to 6 o'clock. Since the starting time of these eight-hour shifts in our various industrial plants is not standardized, we find several periods which may well be termed semi-peaks. This lack of standardization, however, is helpful to the department, since if the hours were standardized we would require a tremendous increase in our rolling equipment to handle the armies of men who would pour into the streets.

While the transportation given by the department is fundamentally electric car service, a co-ordinated coach service is being developed rapidly. The growth and expansion of the city has made it imperative that we go into the coach business to serve newly populated areas on the outer edges of the city where the density of population is sufficient to warrant organized transportation but does not warrant the heavy investment incident to the construction of rail lines.

Coach lines run generally as extensions to the car lines in territory not directly served by the street car. Others are laid out as belt lines through newly developed territory intersecting existing car lines, thus giving a similar service through the transfer to that maintained where the car lines exist. This co-ordinated service works out to the benefit of the city, since the patrons originating their ride on a coach line can transfer, without additional cost, to a car line, and then, upon payment of 1 cent, can obtain a transfer to other existing car lines in the city.

The great expansion of the city demands some form of rapid transit. This may be rendered in two ways: First, of course, by a system of subways or elevated lines, or by a co-ordinated express and local street car and coach service. We are studying at the present time plans for such a co-ordinated service. These plans, which are still very much in the laboratory stage, would provide an express service by running street cars with stops approximately 1 mile apart. This service would be supplemented with a local coach service, or the reverse might be carried out with the coach in the capacity of an express.

One of the advantages of having the local service given by coaches is the ability of the coach to load and unload at the curb, thus avoiding a delay in the general flow of traffic, at the same time protecting passengers from the necessity of crossing through the traffic line to the center of the street to board the cars. The matter of protecting passengers either leaving or intending to board the cars is a serious problem because of the many unusually wide thoroughfares in Detroit. We have several streets of 100-ft. width and our main east and west artery, Jefferson Avenue, is 120 ft. wide. It will be seen from this that the distance from the curb to the car tracks is equal to the width of the average street.

Since, from necessity, the street car stops should be at intersecting street car lines, which means that usually these stops would be where the main traffic on the highway would also stop, there would be an advantage in having the street cars make only such stops, and if a substantial saving in time is made by these express cars, it is not inconceivable that local passengers would transfer from local coaches to the express street cars at these stops in order to get to the center of the city more rapidly.

Such a co-ordinated local coach and express car service would naturally be given only in the more densely populated areas. In other words, the coach routes would terminate approximately 4 miles from the center of the city, at which point the street cars would take up the local schedule to the end of the line. Studies of this co-ordinated service which have been made by this department indicate that on the longer lines reaching into the outlying sections a saving of ten minutes can be made in the run from the center of the city to the terminus of the line.

Since the city is paying for the railway system and its operating costs from the fares received and from no other source, one of the questions which must be answered is whether a line of coaches as outlined above would serve as a feeder to the car lines or act as a competitor, thus cutting down income and defeating the plan of purchase and operation. The studies made so far, however, indicate that the business is sufficient to warrant both classes of service, particularly since the service would be so attractive that competing privately owned jitney and bus companies will be forced out of business. It appears that this may be the solution for the present problem of tract saturation.

Oklahoma Utilities Speakers Announced

PROMINENT men in the different branches of the public utilities field have been selected to speak before the eighth annual convention of the Oklahoma Utilities Association to be held in the Mayo Hotel, Tulsa, Okla., March 9-11. Among those listed on the program are R. B. Campbell, president Midwest Electric Railway Association; Thomas F. Kennedy, member of executive committee H. L. Doherty & Company, New York City; J. E. Davidson, president National Electric Light Association; F. B. MacKinnon, president United States Independent Telephone Association; E. P. Dillon, general manager Research Corporation, New York City; Gen. Charles Keller, Byllesby Engineering & Management Corporation, Chicago; J. W. Gleed, general attorney Southwestern Bell Telephone Company, St. Louis; A. W. Leonard, president Natural Gas Association of America, Tulsa, Okla., and R. H. Sniffin, manager power department, Westinghouse company.

In addition to the general sessions, there will be division meetings for the electric railway, public relations, electric, gas and telephone sections. Ample opportunity for discussion will be afforded on the program.

Central Traffic Meeting

ON MARCH 17 and 18 the Central Electric Traffic Association will hold its next regular meeting at the Portage Hotel, Akron, Ohio.

The morning session on March 17 will be in the nature of a round-table discussion. The afternoon session will be given over to the transaction of committee work. It is the desire of the association, however, that so far as possible all committee work may be completed before the meeting in order to give more time to the transaction of business at the meeting. The session of March 18 will be devoted to reports of committees and such other business as may properly be presented.

American Association News

Mr. Trigg Proposed for Director of Chamber of Commerce

IN A LETTER addressed to member railway companies of the American Electric Railway Association, Executive Secretary J. W. Welsh calls attention to the coming election for directors of the United States Chamber of Commerce, which will be held at the annual meeting in Washington on May 11 to 13. He states that the industry's support has been asked for the election of Ernest T. Trigg, president and general manager of John Lucas Company, Philadelphia, Pa., who is a candidate for re-election from the second district. It is suggested that members communicate with their local Chambers of Commerce and also with any other organization members of the United States Chamber of Commerce in an endeavor to enlist their support in the above election.

Mr. Trigg has been connected with his firm since 1908. He has been general manager since 1912 and was elected president in 1922. He has been on many important boards and commissions of a public character, and was twice president of the Philadelphia Chamber of Commerce. Mr. Trigg is a director of the Philadelphia Rapid Transit Company and the Philadelphia Belt Line Railroad.

Metropolitan Section of the A.E.R.A. Meets March 5

FURNISHING transportation will be the subject of the next meeting of the Metropolitan Section of the American Electric Railway Association. W. B. Wheeler, assistant superintendent of transportation Third Avenue Railway, will present a paper on this subject. It will be discussed by M. J. O'Connor, superintendent of transportation New York Railways, S. S. Hamilton, assistant superintendent of transportation Brooklyn City Railroad, and D. K. O'Rourke, trainmaster Interborough Rapid Transit Company. Entertainment will be supplied by a well-known saxophone quartet from Connecticut.

Maintenance of Equipment

Right-Turn Signals at Louisville

IN ORDER to avert collisions caused by automobilists while attempting to pass to the right of a car when that car is turning into a street to the right, the Louisville Railway, Louisville, Ky., has installed right-turn signals. Similar signals have been installed at other points where cars are likely to back on the main line and create a condition where

Turns." The projector is equipped with a 50-watt lamp in a 9-in. parabolic glass reflector with red cover glass and makes a brilliant effect even in daylight. The floodlight reflector has a 50-watt lamp also in series with the projector. This display of signals not only gives an arrestive warning, but explains the reason for it.

After the car has made the turn, it passes under a normally open contactor of the short type, which picks

Fixture for Edgewise Bending of Rings

FINISHING rings for flush type headlights are made of $\frac{3}{4}$ -in. flat stock $\frac{1}{8}$ in. thick in the shops of the Eighth Avenue Railroad, New York, N. Y. The rings are formed by bending the stock edgewise in a special fixture, which is shown in the accompanying illustration. The fixture has a central portion, around which the bending takes place. A slot in this central ring keeps the stock in place and prevents it from turning up. A clamp to hold the end of the stock is pivoted from the central part of the ring, and the forming arm has rollers, with a groove to hold the edge of the flat



Signals in Connection with Floodlighted Signs Warn Motorists When Cars Are to Take a Turn. At Left, Pole Mounting for Sign. At Right, Pipe Bracket Mounting

vehicles should not approach too closely. The equipments were furnished by the Nachod and United States Signal Company and include a red projector, a floodlighted sign, a clearing contactor in the trolley wire and a relay in a box mounted on a pole.

When used in connection with a Cheatham switch, the same operation of the car under the Cheatham contactor that throws the switch-point for the diverging route shunts out a relay in a normally closed circuit. This causes its armature to drop to a back contact, closing a circuit to illuminate the red projector and to floodlight a sign reading "Car

up the "stick" relay again, and thus removes the indication. The railway has installed six of these in various parts of the city. One is used to give warning that a car is about to back over a piece of double track while wye-ing; in this case the sign reads "Car Backs." It is controlled by two independent contactors. Another is placed where the car line swings across the street to make a terminal loop. One illustration shows the outfit mounted on $1\frac{1}{2}$ -in. pipe bracket, extending from the pole with sign and projector at the outer end of the bracket. The other shows a sign and projector mounted against the pole.



Fixture Used to Form Headlight Finishing Rings from Flat Stock. A Finished Ring Is Shown in the Background

strip. These roll the ring into position. This forming arm is also pivoted from the central part of the ring.

To form a ring, the stock is heated so that it will bend readily, and the end is then placed in position and held firmly by the clamp of the fixture. By rotating the arm, the rollers force the flat stock into the groove of the central ring of the fixture and so bend it into circular shape. After the rings are formed, the ends are scarfed and welded by a blow from a hammer.

Changeable Sign for Front and Rear Entrance

DURING rush hours cars of the United Electric Railways, Providence, R. I., are operated with two men, but at other times many one-man cars are in operation. Passengers may board cars at the rear end with two-man operation, but must, of course, enter at the front of

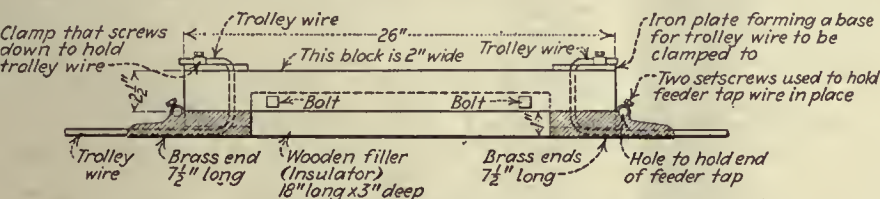
ng and wheel in proper alignment. This has necessarily aided in eliminating worn journal box bearings, worn axle heads and grooved truck and journal box housings.

Long Section Insulator Used by Union Street Railway

A 26-IN. wood section insulator designed by Peter Dupuis, line foreman, is used by the Union Street Railway, New Bedford, Mass. It has an oak filler 18 in. long, which makes a positive breaking of the current. This filler is driven into a slot in the breaker and is held firmly in position by two through bolts. The brass approaches are

two frogs being constructed. These are made in one piece to avoid joints. The guard rail is cut to the proper length and is then bent to the radius desired. The rails are fitted together and a slight space is left between the rails of the central points where the welding is done. After the work is set up, measurements are checked against the drawings before the pieces are finally bolted down to timbers for the welding operation.

A mold constructed in standard manner is placed around the point where the thermit metal is to be deposited, and a crucible is set over the junction of the rails. The thermit welding is done in the usual manner.



Section Insulator Designed to Prevent Damage to Ends of Trolley Wire

7 1/2 in. long and are ordinary except for the special device for holding the ends of the feeder wires. These are not soldered, but are held in a socket provided with two setscrews. This method insures proper contact and at the same time the feeder wires can be easily removed. The ends of the trolley wire are passed through a gradual curve on the ends of the breaker and firmly held on the top of the breaker by means of an iron plate equipped with an iron clamp provided with two bolts. This method avoids damaging the ends of the trolley wire. Another advantage of this type of breaker is that the ends of the trolley wire are of sufficient length so that they are held in such a position that a maximum of strength is obtained.

Special Work Made by Thermit Welding

SEVERAL simple pieces of special work have been made in the Rochester shops of the New York State Railways by using their new thermit welding outfit. In this work, measurements of the old frogs which are to be replaced are taken in the ground by the railway engineering department. A sketch is made up from these measurements, and the work is done in the blacksmith shop under the direction of Louis Kubiak. The accompanying illustration shows

The illustration shows the metal as freshly deposited at one of the frog points of the double frog being made. The sand about the mold has been removed. After the metal is cooled properly, it is ground to a smooth surface at the top and the proper groove is ground to permit the passage of wheel flanges.

The cost of constructing special work as indicated is much less than what would be required to buy the pieces from manufacturers, but of course these frogs will not last as long, as they contain no solid manganese points to take the excessive wear at the centers.

Discarded Headlights for Indirect Park Lighting

SOME 18 miles north of Toronto, along the main highway and the route of the Toronto & York division of the Hydro-Electric Railways, lies a fine pleasure resort comprising a lake of more than 50 acres and another 165 acres of adjacent beach and woodland. When this park was in the hands of the original Toronto & York Radial Railway it was operated directly by the railway at a substantial loss. Under the Hydro-Electric Commission, however, the grounds have been turned over to a professional amusement concern, with the result that the railways are in a fair way to be relieved not only of the former operating expense, but of interest on the investment as well. This desirable end will be aided by a housing development scheme whereby cottage builders will be able to secure lots at a distance of only 300 ft. from the lake, their homes being made accessible by a 30-ft. roadway to be built at the rear of the cottages and going round the lake.

One of the features that has helped to popularize the park is a novel and economical scheme of indirect illumination. At the lake end nearest the highway is a power house and plenty of shrubbery. Concealed in this shrubbery is a battery of discarded arc headlights. These headlights produce illumination similar to that of a monster searchlight of an excursion steamer and of course attract the favorable attention of the thousands of travelers on the main highway near by. As the power used is entirely off-peak, the principal cost is for replenishing carbons.



Two Special Work Frogs Set Up for Welding in the Rochester Shops of the New York State Railways

The News of the Industry

Wage Change in San Francisco

The Market Street Railway employees of San Francisco, Cal., have received a voluntary wage increase of 2 cents an hour, effective Feb. 28, while the San Francisco supervisors have just denied more pay to the employees of the Municipal Railway. Under the new scale Market Street Railway employees will receive 56 cents an hour. Commensurate increases were given in all other departments, including shops, substations and track repair men. Samuel Kahn, executive vice-president of the road, said that the raise was entirely voluntary on the part of the management and would cost the company about \$200,000 annually. About 2,500 men are affected. This action followed shortly after similar action by the California Street Cable Company. It is in line with the policy of restoring wages to the pre-war maximum.

The decision of the supervisors denying Municipal Railway employees an increase in wages from the present scale of 67½ cents to 75 cents an hour was attended by a series of bitter attacks by representatives of the men. The combined finance and public utilities committees of the San Francisco Board of Supervisors said, in effect, that it wanted to give the raise but it could not find the money for the purpose. The spokesmen for the employees said the money should be found even if a 6-cent fare were necessary.

It was agreed by the committees that there was at hand a sum amounting to \$343,000 which might be used to pay the wage increase demanded, but they also pointed out that this would last for only two years and that afterward there would be an annual deficit. Expert accountants retained by the employees declared that the figures quoted by the supervisors were obtained through erroneous bookkeeping methods and that there was money enough to meet the increase. They urged rectification of the accounting system. In the end it was agreed that there must be some changes in the financing before any pay increase could be recommended.

Committee to Study Atlanta's Needs

Mayor Sims of Atlanta, Ga., following a councilmanic resolution, has named a new committee to consider the "relief petition" of the Georgia Railway & Power Company. The petition of the company was filed early in December and suggested seven different remedies of relief. One of these, the elimination of jitney buses from the streets, has already been granted, and another, that of eliminating certain unnecessary street car stops, has been recommended by the Council and is now

before the Public Service Commission for action. The other suggested remedies are: Elimination, to the extent necessary, of the gross receipts tax and

street paving assessments; 10 cents for cash fares, with a special rate for riders who use tickets, and a 2-cent charge for transfers.

Railway and Bus Company Unite in Bid

New York City Companies Would Abandon 25 Miles of Track and Run 50 Miles of Bus Routes at Five-Cent and Ten-Cent Fares with Transfers on Latter

AN EXCLUSIVE franchise to operate an extensive bus system in Manhattan on which 5 cents would be charged on crosstown lines and 10 cents on longitudinal lines was sought in a joint petition presented on Feb. 24 to the Secretary of the Board of Estimate of New York City by the Fifth Avenue Bus Company and the New York Railways. The two companies announced an amalgamation for the purpose of bus operation and offered in return for the franchise to eliminate 25 miles of street car tracks, remove 200 cars and to give up perpetual franchises owned by the railways.

A summary of the main points of the new petition, follows:

(a) Marks first move toward the installation of a comprehensive motor coach service through co-operation of effort and co-ordination of facilities of existing surface car companies.

(b) Discontinuance of the use of 25 miles of street car tracks.

(c) Surrender of perpetual franchises to operate street cars on those tracks.

(d) Removal of over 200 street cars from the congested city streets.

(e) Operation of ten crosstown motor coach lines—23.96 miles of route—for a 5-cent fare.

(f) Operation of three longitudinal motor coach lines—24.58 miles of route—at a 10-cent fare.

(g) A universal transfer system, under which by means of transfer and retransfer for a single fare of 10 cents a person may ride from any point on the system to any other point thereon.

(h) A modern motor coach system covering about 50 miles of routes in Manhattan.

(i) Service to be started at once on certain lines and full service to be in operation in 90 days on the remainder of the system.

(j) Provision made for recapture by the city after five years for the purpose of municipal ownership and operation.

(k) Efficiency of service guaranteed by a staff of men experienced in omnibus operation and familiar with local transportation conditions in Manhattan.

Through John A. Ritchie of the Fifth Avenue Coach Company as spokesman, it was disclosed that controlling interests of that corporation and of the New York Railways had effected the amalgamation through the formation of a company just incorporated as the New York City Omnibus Corporation, of which Mr. Ritchie is president and J. M. McCarthy secretary.

The consolidated company withdrew the previous applications made by the Fifth Avenue Coach Company and the New York Railways and submitted its new joint plan, which calls for a virtual monopoly of bus operation in Manhattan with extensions into the Bronx.

The corporation also makes provision for recapture in the interest of municipal operation by the city after five years of private operation, if the city should so elect.

A statement by the sponsors for the new application concerning their proposal follows:

Under this plan presented by the New York City Omnibus Corporation, headed by John A. Ritchie, the new system can be put into immediate operation, first, because the new corporation has available the unique facilities of the Fifth Avenue Coach Company, including buses, equipment, personnel and organization, to put such a system into immediate operation, and, second, because all danger of litigation between the interests involved would be at once eliminated, and the city would, moreover, without expenditure, regain control of many of the streets, its use of which is now restricted by existing perpetual franchise grants.

Traffic all through the Borough of Manhattan would be vastly speeded up; congestion due to unnecessary duplication of routes would be eliminated, and the transit facilities of the borough would be placed in a more plastic state, whereby the city would mold them more nearly to meet the needs of the changing conditions.

The new company proposes that as soon as practical other street car lines of the New York Railways shall be motorized and the street-car tracks taken out. The ultimate object of the new company is to extend this plan to all street-car operation in Manhattan when and as soon as possible and practicable.

Sixth, Seventh and Columbus Avenue, three of the traffic arteries, would be immediately freed of street-car tracks under the plan, and Eighth Street and 116th Street for the most part would be immediately similarly cleared of inflexible street railway lines.

The crosstown routes, ten in number, would be operated at a 5-cent fare. The longitudinal lines would be operated at a 10-cent fare. Free transfers would be issued from the 10-cent lines to the 5-cent lines and to the other 10-cent lines, and a 5-cent transfer would be sold on the 5-cent lines for use on the 10-cent lines. The transfer privilege would allow a person by use of a transfer and retransfer to ride from any point on the system to any other point on the system, for a single fare of

10 cents. This is the most comprehensive transfer arrangement which has been submitted with the proposals for bus operation in the Borough of Manhattan.

The proposal provides for the recapture by the city for municipal operation after five years at a valuation to be agreed upon by arbitration.

The routes proposed not only include substantially all of those laid out by the City Board of Transportation, but also additional routes provided for by the surrender of part of the perpetual franchise routes of the New York Railways—that is, Sixth, Seventh and Columbus Avenues and other thoroughfares. Service on some of these routes can be started immediately and the entire system can be completed and placed in operation within ninety days.

Approximately 200 surface cars would be eliminated by the plan and the passenger-carrying capacity of the borough's surface lines would be increased vastly by the installation of 210 double-deck and 202 single-deck motor coaches on the super-seeded electric lines and the additional new lines contemplated, which buses would be of the finest and most modern type and practically noiseless.

Consideration was given in the plan of the system to the elimination of inconveniences of unnecessary transferring by making provisions for the through routing of vehicles between extreme points in the borough at a maximum cost of 10 cents to the passenger.

The most of the afternoon of Feb. 24 was devoted to conferences with representatives of three of the principal competing bidders for bus franchises in Manhattan and to a general study of the terms and conditions offered in their respective petitions. The three applicants were the Service Bus Corporation, the Fifth Avenue Coach Company and the People's Electrobuses Corporation.

It is said that the Fifth Avenue Coach Company also plans to combine a new bid with that of the Third Avenue Railroad subsidiary in the Bronx and may file a joint supplemental petition for the Bronx. The Third Avenue bus subsidiary is known as the Surface Transportation Company. The Third Avenue Railway now enjoys the greater part of all the road surface transportation in the Bronx.

Mayor Walker said on Feb. 25 that no action on the application of the New York City Omnibus Corporation could be taken until after consideration of the other applications for bus franchises and after the statutory hearings on the petitions yet unheard. The Board of Estimate fixed March 11 to hear the omnibus corporation.

Jersey Paving Bill Laid Over

After a fight in the Legislature, Senator Frank D. Abell of Morristown was compelled on Feb. 23 to lay over his bill to relieve street railway companies from paving obligations. On three roll calls he was able to get only ten of the eleven votes necessary for the passage. Although several Senators joined in the debate against the measure, Simpson of Hudson County and Roberts of Burlington County were the only ones to vote in the negative, the others remaining silent as their names were called.

Senator Abell said that the obligations originally assumed by the traction companies had become obsolete, and he charged that it was unfair to continue to compel them to help keep up the roads used by competing jitneys and motor buses. He declared that the Morris County Traction Company was in bankruptcy and that unless relief were granted trolley service would be

lost to the working people. He argued that eight states have relieved trolley companies of such obligations.

Senator Simpson led the attack on the bill. He said that the utility companies, in order to obtain their valuable franchises, had agreed to certain things that they were now finding expensive

and that if they were allowed to escape the burden it would have to be borne by the municipalities. He said in the next six years it would cost Jersey City \$2,500,000 and Hoboken would have to pay several hundred thousand dollars on paving that had been neglected by the Public Service Railway.

New Deal Suggested for Worcester

Special Committee Named by Mayor to Investigate City's Street Railway Needs Favors Transportation Monopoly as Best Policy, with One Company Operating Trolleys and Buses

THE entire passenger traffic of the city of Worcester, Mass., should be handled by the Worcester Consolidated Street Railway, whether by trolley cars or buses used in conjunction with the trolley cars. Changes should be made in the regulation of the routing of buses so used, so that every emergency of traffic might be met with the least inconvenience. These are the principal recommendations submitted to Mayor O'Hara by the special commission appointed to investigate.

Among the most vital needs are given the speeding up of the trolley service in the city, provide new and up-to-date cars equipped with proper safety devices, that will permit the company to meet the new conditions that have come with the fast-moving automobile competition. At present the average speed of trolleys is a trifle more than 8 m.p.h.

An interesting feature of the report is the finding, based upon an actual count of passengers carried at the busy hours in Worcester, that buses cannot take the place of trolleys, but only aid in the carrying of traffic because the streets could not accommodate sufficient buses to handle the problem.

The report was drafted by Prof. Albert S. Richey of Worcester Polytechnic Institute and was adopted by the full committee, which included Frank H. Willard, City Solicitor William C. Mellish, William J. Flickinger for the New Haven Railroad, Clark V. Wood, president of the Worcester Consolidated Street Railway.

The report came as a result of the study made by the special commission of Worcester trolley needs, prompted by the appeal of the officials of the New York, New Haven & Hartford Railroad for co-operation from the city of Worcester in the effort of the railroad company to have legislation enacted at the State House that would permit the railroad to take back control of the trolley lines of the state, and on which the railroad officials in return promised to expend large sums of money in rehabilitation. Worcester was slated to have \$1,000,000 of the proposed amount to be so expended in improving the service, and more if needed.

Professor Richey says the competition of the privately owned automobile has very seriously reduced the patronage of the railway in Worcester, as it has in every other comparable city of the country. It is believed, however, that with the proper rehabilitation of the railway, including the substitution of a considerable number of comfortable, convenient, attractive, and thoroughly modern cars, and especially if some improvement can be made in oper-

ating speed, a great deal of this lost patronage can be regained.

Among other things the report as presented says:

One of the most vital factors entering into proper street railway transportation is speed, and there should be a proper co-operation by the city officials toward its attainment. There is no question but that the larger part of the traveling public is served by the street cars, or that the street car is by far the most economical user of street space. Both of these facts are demonstrated by counts made within the past two weeks and referred to later, herein. Any steps taken to expedite the movement of street cars are for the general good of the entire city.

The company owns about 168 closed cars, most of which are less than 20 years old, and which are suitable for present service, with the exception of 25 cars which have been remodeled from open cars, have high platform, two steps and narrow doors, and which for those reasons unduly slow up service and consequently should be retired. This leaves about 145 closed cars which I agree with Mr. Wood are suitable for present operation, and deducting this number from the requirement of 220, Mr. Wood arrives at his number of 77 new cars to be purchased. He speaks of the proposed new cars as "lightweight one-man two-man cars," which agrees with the Day & Zimmermann statement as to a suitable type of car for this property, and with which I also agree, except that in the light of recent experience elsewhere, I believe practically the entire operation can be with one man, especially if the cars are designed to facilitate the movement of passengers and the collection of fares, including such devices as the treadle-operated rear exit door.

EQUIPMENT SHOULD BE OVERHAULED

The purchase of new cars should be accompanied by a complete overhauling and repainting of all of the existing equipment which is retained in the service, and the future policy should and of course will include that of good housekeeping to the extent that cars are kept well painted, clean, safe and comfortable in operation, and manned by operators who at all times consider themselves as enthusiastic salesmen of a proper transportation service as much as the servants of the public as though in its direct employ.

The additional bus service suggested by Mr. Wood in substitution for railway service on the Worcester & Webster and Webster & Dudley lines and the Blackstone Valley division, south of Millbury, are matters which are most important to the city of Worcester. Such lines as these can be served best by bus, and in my opinion such substitution should be made.

Within the city of Worcester, it is doubtful if there is any section which at present is not served properly either by street cars or buses, but the street railway should be ready to provide one service or the other as soon as the need for it is demonstrated, and it is shown that a reasonable patronage is ready for the service.

With traffic which requires as does Park Avenue operation the use of street cars as frequently as 22 in a period of 1½ hours, there can be no question but that such operation is much more economical than would be that of buses, even if there were street room for the latter.

Relative to the reconstruction of various tracks in the city comprising about 34,000 feet of track in twelve locations, there is no question but that a proper rehabilitation of the railway would include such reconstruction. The railway should co-operate with the city in connection with all track reconstruction, to the end that where such reconstruction is necessary and the street is to be rebuilt, the work be done simultaneously, and at such time as

the city is ready to proceed with its work. In connection with track reconstruction and betterment, automatic electric switches should be installed at all points where track switches require movement in the operation of one-man cars.

In order to determine the relative use of the street by automobile and street car, I arranged for counts to be taken on South Main Street at Wellington Street, on Jan. 26, 1926. All outbound traffic was listed during the period between 4 and 6:30 p.m., and during that period the following outbound traffic was noted:

Six hundred and ninety-four private automobiles, with 1,144 passengers.

One hundred and thirty automobile trucks, with 196 passengers.

Twenty-two taxicabs, with 41 passengers.

Eight hundred and forty-six total automobiles, with 1,381 passengers.

Seventy-one street cars, with 3,127 passengers.

Professor Richey says it is probable that this count represents a fair cross-section of all cars and riding persons leaving the downtown section in all directions. He directs attention to the fact that although less than 8 per cent of the vehicles were street cars, they handled 70 per cent of the persons; also that the average number of passengers per automobile was 1.63, while the average number of passengers per street car was 44. He says that when it is considered that the street car occupies no more street space than two automobiles, the remarkable efficiency of street cars as a transportation agency as compared with the automobile is manifest, together with the fact that it is handling many more than double the number of passengers traveling by all other agencies. True, the above observations were taken wholly within the rush hour, but Prof. Richey says it must be remembered that this is the time during which the traffic problem is most serious.

School Regulations in Chicago Expedite Railway Travel

A step in curbing the exuberant youth in car loading at the high schools of Chicago, Ill., has been taken as a result of the ingenuity of the leaders of one school who devised and caused the adoption of regulations to get the students on their way home in orderly fashion. The regulations have been published as a model and are the product of Tilden Technical High School students. The school is one of a number at which several thousand students clamor for street car service, mostly at the same time. The regulations follow:

On each corner will be about four cadets with one senior cadet in charge. As soon as a car is available, one cadet will call the destination of the car, as, for instance, "Halsted and 79th." When the car is loaded a director will give signal for car to start. If there is a car superintendent present, he will give signal for the car to start.

Follow These Instructions

1. Line up in a single file parallel to the street car.
2. Do not get on the car while it is in motion.
3. Do not stand on the rear platform of the car unless it is impossible to enter the car.

Purpose of Regulations

Develop a well-regulated system of boarding street car and passing between periods which will:

1. Safeguard the lives of the students.
2. Save time.
3. Prevent congestion.
4. Give Tilden a good name.

Slogans

"Line up" "Have fare ready" "Speed up"
"Move Along"
Goal
"To make the best better"

Willing to Surrender Massillon City Franchise

Heavy losses sustained in the operation of its city lines in Massillon have led the Northern Ohio Traction & Light Company to ask the Council of that city for permission to discontinue its city service. Such application has no bearing on the interurban service between Massillon and Uhrichsville on the south or Canton, Akron, Cleveland on the north.

The company does not desire to be placed in the attitude of attempting to evade its contract, and for that reason has hesitated to suggest an abandonment of the system to the City Council and citizens of Massillon. It develops, however, that a bus company has been organized with capital sufficient completely to motorize the city. In view of this, the company has expressed a desire to abandon its so-called city lines, leaving the interurban line through the city.

The company has felt for some time that the people of Massillon wanted a bus transportation system for the city, but it does not now desire to extend its bus operations to that extent, nor has it in the past desired to do so. The company which has proposed to put in a bus system is experienced in bus operation.

On its part, the Northern Ohio Traction & Light Company has offered to aid the city and applicant company to establish a permanent bus system. The company believes that in cities the size of Massillon a bus system can be operated which will be of greater benefit than the present rail system, and meet more adequately the needs of the public than does the railway. The company's present contract has only a few years to run. The lines have been operated year by year at considerable loss.

The proposal of the bus company, headed by Frank Booth, fixes a rate of fare at 8 cents cash, two tickets for 15 cents. It is intended to operate upon the principal streets of Massillon, and particularly to serve the steel mill district.

The application of the bus company and the one for abandonment will come before the Council on March 1.

\$11,000,000 Milwaukee Budget

Approximately \$11,000,000 will be spent by the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., and its associated companies under the 1926 budget adopted at the annual meeting on Feb. 17. The program provides for these disbursements:

Milwaukee Electric Railway & Light Company, \$6,100,000; Wisconsin Electric Power Company, which owns the Lakeside power plant, \$2,300,000; Wisconsin Gas & Electric Company operating in Racine, Kenosha, Waukesha and other communities in southeastern Wisconsin, \$1,600,000; Wisconsin Traction Light Heat & Power Company, operating in Appleton, \$800,000; Badger Public Service Company, operating in Elkhart Lake and other Sheboygan County communities; Peninsular Power Company, operating in the northern peninsula of Michigan, and the Milwaukee Northern Railway, \$200,000 among them.

The greatest single expenditure will be \$2,300,000 for equipment to increase the output of the Lakeside pulverized fuel plant. Approximately \$2,000,000 will be expended on the electric railways, exceeding by \$600,000 the expenditure during 1925. About \$1,000,000 will be required to complete the Waukesha interurban cut-off. Reconstruction of track in Milwaukee will require approximately \$885,000.

New Problem in Jacksonville

In view of an adverse opinion from Austin Miller, city attorney, of Jacksonville, Fla., no referendum on the proposal that the city acquire by purchase and operate the Jacksonville Traction Company will be called by the City Commission, according to Frank H. Owen, chairman. The popular vote, which was requested by the City Council, was scheduled for April.

According to the opinion by Mr. Miller, it would be illegal for the city to spend public funds to determine "whether or not the city should do something it is not authorized to do by its charter." If any individual or group wants to press for a referendum, according to the opinion, it will be necessary to go to the Legislature for an act empowering the city to engage in street railway ownership.

So the Public of Baltimore May Know

The United Railways & Electric Company, Baltimore, Md., is conducting an advertising campaign through the Baltimore newspapers which gives the public intimate details of the street car system and how it is operated. Several of these advertisements have appeared.

The United takes the view that this advertising, if steadily and consistently presented, will greatly benefit the city, the patrons and the company.

The following benefits are listed:

A better understanding of the street car company's problems.

More street car riders and increased revenue for the company.

Better street car service.

A quickening of the city's progress, which is bound to be dependent upon the quality of its transportation facilities.

The company says:

Big improvements in street car service are expensive—more expensive now than ever. And yet rapid transit must grow and improve if the city is to grow and improve. In order to increase its capacity for improvement the company must increase its revenues. The sole source of a railway's revenue is its riders. Its income consists entirely of individual car fares. It cannot have more income until more Baltimore people ride the street cars. With increased riding and increased income there must come major improvements in service.

For years and years street car companies have been almost inarticulate. Other institutions, public and private, with problems to be solved and work to do have taken the public into their confidence and have asked their help and understanding. Street car men have worked in silence. Being in closer contact with the exacting and critical public than any other public utility they have leaned in the direction of taciturnity under fire. Work hard, take your medicine, keep quiet. That was the creed of the old time street car man.

It was a praiseworthy and creditable creed and it still is. But today "keep quiet" is a principle easily carried to extremes. The United intends to continue to live up to it. But it will amend the principle to this extent—it will not require the Baltimore public any longer to guess at the truth about its affairs or to accept misstatements in place of the truth.

These are the reasons for the United's advertising.

Franchise Memorandum on File at Louisville

A tentative memorandum regarding abolition of the present franchise and fare ordinance, under which the Louisville Railway, Louisville, Ky., now operates, and replacement of it with a new one, with a higher cash fare and slightly lower than present ticket fare, has been placed in the hands of Mayor A. A. Will. It is expected the memorandum will be made the basis on which something tangible may be worked out.

Experience seems to have proved that the present modified service-at-cost ordinance under which the company operates could well be modified in its provisions to the benefit of the city and the company.

News Notes

Metal Tokens in Use.—The Beech Grove Traction Corporation, connecting Indianapolis, Ind., and Beech Grove, has discontinued the sale of its five two-zone tickets for 50 cents and is now using metal tokens and Johnson fare boxes. The majority of patrons, it is said, prefer the metal tokens.

Seeks Increase in Fares.—The Union Traction Company, Coffeyville, Kan., has petitioned the Public Service Commission for an increase in its fares in the cities of Parsons, Cherryville, Independence and Coffeyville. The company requests a boost in local fares to 8 cents or two tickets for 15 cents, with a book fare of 25 rides for \$1.65. The present rate is 6 cents with a 5-cent book fare. The case was set for hearing at Topeka March 1.

Books Extended to Fourteen Days.—The Public Service Commission has approved an amended local passenger tariff of the Geneva, Seneca Falls & Auburn Railroad, Inc., Seneca Falls, N. Y., changing the limit on 20 trip commutation ticket books from ten to fourteen consecutive working days. This amendment was effective Feb. 15 under special permission of the commission.

Metal Tokens Again in Louisville.—The Louisville Railway, Louisville, Ky., which has been issuing paper tokens since Feb. 1, has gone back to the metal tokens, following complaints of patrons. The tokens are the same as those previously used by the company. There is no saving for the consumers in buying tokens. They are sold at the rate of seven for 35 cents.

Higher Fares Discussed at Hearing.—The railway division of the Illinois Power Company, Springfield, Ill., is making less than 3½ per cent of its investment and last year fell \$96,719 short of earning the 7 per cent return allowed by the State Commerce Commission, according to reports of accountants and engineers presented at a recent hearing. The increased fare proposed would retain the 10-cent cash fare, with tokens increased from four for 25 cents to seven for 50 cents and family fare books from \$2 to \$2.50 for strips of 40 tickets.

Foreign News

Bermuda to Have Electric Railway

Permission has been granted for the construction of a tramcar line in Bermuda, and it is planned to start work on it in the next few months. The ban has not yet been lifted on automobiles and motorcycles, so the single motor truck to carry freight remains the only representative of the automotive family.

"Antiquity, even in transportation facilities, is part of the stock in trade of Bermuda," says a bulletin from the Washington, D. C., headquarters of the National Geographic Society. "To the visitor this is one of the chief sources of its charm. There are no industries other than agriculture and catering to the tourist trade. The steamboat whistle and the clatter of horses' hoofs on the smooth hard roads are the only foreign noises that disturb the Sabatistical quiet of the island."

Plans Approved for Lisbon Subway

Concessions for the construction of a metropolitan subway in Lisbon, Portugal, has been granted by the Municipal Council of that city to a Spanish group. This concession comprises eight lines radiating from the Rocio Square over a total area of about 16½ miles. The hilly nature of the city will necessitate deep construction, but stations will be near to the surface and elevators need not be installed.

Vignole rails, 59½ ft. long with fish plates and weighing 90 lb. per yard, will be used, with a gage of 4.72 ft.

It is planned to build this subway in eight sections, each costing approximately \$2,250,000. The Spanish engineers are now seeking an initial loan of foreign capital in the amount of \$200,000 to defray the expenses of the first section built. It is proposed to finance the successive sections by capital flotations and local loans in Spain and Portugal.

National Electric Scheme for Great Britain

The general electricity supply plan which the British government is contemplating has some interest in the realm of electric traction, because if it is carried out many small power stations will be closed and energy taken from great economical stations.

The three main features of the new government scheme are large generating stations, a national board and distributing stations. The generating stations are to number about 60. The electricity produced by them is to be purchased by the board and sold to the distributing stations. Interconnecting power lines will be established by the board between the generating and distributing stations. Many small power stations will disappear. To allow interconnection between generating stations,

it is proposed that a standard frequency of 50 cycles per second should be set up for the whole country. Cheap and abundant supply for all purposes is the goal, but it is recognized that a good many years must elapse before much benefit can accrue.

Many municipalities which have power stations and the steam railway companies which contemplate electrification will probably oppose the plan. If the plan is successful, many of the smaller tramway undertakings in the country should benefit from having a power supply from the national mains at a cheaper rate than they can produce for themselves.

Underground Railways for Manchester.—Proposals for the construction of underground electric tube railways in Manchester, England, are again being revived. The plan is for a circle railway with a central station, from which radiating lines would be constructed to the outside areas. The estimated cost is from £250,000 to £300,000 per mile.

Liverpool to Purchase Tramway System.—Purchase of the Waterloo & Great Crosby tramway undertaking has been decided upon by the Liverpool, England, City Council. This railway has been operated by the Liverpool Overhead Railway, but its lease on the lines will soon expire.

Electrification Planned in Czechoslovakia.—Contracts were placed recently for the first electrifying project of the Czechoslovakian State Railways. This comprises the electrification of the Prague railway stations and the connecting lines. A considerable part of this contract work has been placed with the Skoda Works, whose special department for electric railways has developed into the largest and most modern undertaking of its kind in Czechoslovakia.

Electric Train Test in Sweden.—Successful trial runs with electric goods trains took place recently on the Moholm-Falkoping section of the line between Stockholm and Gothenburg, Sweden, the electrification of which will soon be completed. Four trains were dispatched simultaneously in each direction, the longest consisting of 50 trucks. A fully loaded train maintained a speed of 37½ m.p.h., even on the steep grades on the line.

Trackless Trolley in Darlington.—Inauguration of the trackless trolley system in place of the tramways in Darlington, England, is now taking place. This is a complete substitution. The financial position of the municipal tramways would not permit the extensive renewals required. This tramway system was opened in 1904 and has never been financially successful. The type of trolley bus adopted is a single-deck, 31-passenger vehicle with a central door. The interior is divided into two compartments, one being used as a smoker.

Recent Bus Developments

Plan at Buffalo Collapses— Railway Renews Offer

Plans of Ernest M. Howe, Detroit, and the American National Omnibus Corporation, New York, to establish 5-cent bus service in Buffalo over thirteen routes covering 71.5 miles of streets have collapsed following the failure of the company to complete its financing arrangements as ordered by the Public Service Commission. The company lacked \$300,000 of the necessary \$1,500,000 paid-in capital on the last day allowed by the state utilities board to complete its financing and appear before the commission for a hearing on its application for a permit.

With the announcement that the Howe plan had collapsed, Bernard J. Yungbluth, president of the International Railway, Buffalo, and its subsidiary company, the International Bus Corporation, said the traction interests plan to carry out the first steps of the co-ordinated bus-trolley plans filed with the Buffalo City Council last summer. These plans were held up by the municipal authorities when Mr. Howe entered the field with his 5-cent bus proposal, for which he later secured a franchise from the city.

The application of the International Railway and the International Bus Corporation on file with the city covers five of a dozen steps in a general plan for co-ordinated bus-trolley service. These are:

Establishment of a Best-North Street bus line and abandonment of the Best Street car line; establishment of a Richmond Avenue bus line and abandonment of the Hoyt Street car line; extension of the Bailey Avenue bus line from Kensington Avenue city line to East Seneca Street and over McKinley Parkway after the parkway is completed and abandonment of the Bailey Avenue car line; extension of the Delaware Avenue bus line from the Terrace to Shelton Square at Main Street; rerouting Delavan Avenue bus line, a cross-town service, over Potomac Avenue from Chapin Parkway, which will allow abandonment of part of the Forest Avenue car line from Delavan Avenue to Niagara Street.

There will be little opposition to the establishment of new bus routes and the extension of existing bus lines, but it is understood the City Council is opposed to the abandonment of car lines which have been long established, on the basis of the plan outlined in the Yungbluth proposals.

Allentown Bus Service Planned

In furtherance of a statement made some time ago by the Lehigh Valley Transit Company, Allentown, Pa., of its intention to adapt the bus to the transportation problem, comes the announcement from H. F. Dicke that a bus line operating on Turner Street, between Nineteenth and Seventh Streets, would be established as soon

as the Public Service Commission granted the permit. The plans as they now stand call for a fifteen-minute service for two periods of three hours each in the morning and evening and a 30-minute headway during the rest of the day. Two buses will be used to maintain the former schedule and one during the so-called off-peak hours. A 10-cent fare will be charged. This will include transfer privileges to any of the company's lines. In opening the new line the company had in mind the accommodation of customers living far from present car lines.

In December of last year the company applied for a certificate to operate buses for "group and party service."

Railway Pays State Biggest Bus Bill

A check for \$50,009, the largest bus license ever paid in the State of Minnesota and one of the largest ever paid in the United States, was delivered on Jan. 27 by the Twin City Motor Bus Company, Minneapolis and St. Paul, to Mike Holm, Secretary of State of Minnesota. This company is a subsidiary of the Twin City Rapid Transit.

The check is in payment of the 1926 license for 94 buses and four service cars operated by the bus company on its intercity lines as well as several suburban lines. This is a tax of 10 per cent on the list price, with a depreciation allowance of 10 per cent a year with a minimum tax of \$350 for each bus operated.

The average fee is approximately \$500 a bus. In addition to this state tax the company pays federal taxes of \$20 a bus for the year May 1, 1925, to April 30, 1926. This is an additional tax of more than \$8,000, or an aggregate tax of approximately \$58,000.

Abandonment and Bus Petitions Before Utah Commission

The Utah Light & Traction Company, Salt Lake City, Utah recently applied to the Public Utilities Commission for permission to abandon its Davis County line, serving the towns of Centerville and Bountiful and intermediate territory. The application was in the form of a petition in intervention before the commission at the hearing of the application of the Bamberger Electric Railroad, which is seeking a permit to operate an automobile passenger and express line between Salt Lake and Ogden. It is requested that if the order of abandonment is permitted to the railway the bus line application of the interurban should be allowed provided the bus service will not pick up passengers in Salt Lake for discharge within the corporate limits of the city. If, however, the commission should refuse the petition in intervention, it is asked that the petition of the Bamberger company be denied.

Holyoke Railway Wins Point

The Holyoke Street Railway and the Interstate Bus Corporation, both of which have aired their differences in the county criminal and civil courts, have had their case settled by a triple bench of the federal court. Massachusetts bus control statutes were found to be constitutional, and the Interstate Bus Corporation is to be restrained from operating buses through Massachusetts cities without a license to do so. An injunction has been issued.

The Interstate Bus Corporation operates lines in all of the New England states except Maine. Its principal field of operation is in Boston and Providence. It recently brought proceedings into the federal court against the Holyoke Street Railway alleging collusion in interfering with the bus business in Holyoke, Mass. The suit was a counter one against the railway, which sought an injunction to prevent the bus company from operating.

The litigations began with a suit by the Holyoke company to prevent the operation of buses between Greenfield and Springfield, Mass. The suit was removed to Boston and warrants for the arrest of the bus company's chauffeur's followed. The bus company filed a complaint in an equity suit and obtained an order to show cause why an injunction to restrain the criminal prosecutions should not be granted. This order was given only after a long-drawn-out hearing.

Judges George W. Anderson, John A. Peters and Elisha H. Brewster ruled:

These two cases have, by agreement, been heard together on agreed facts. They are, in effect, cross suits, and involve a single issue—the constitutionality of the Massachusetts statutes regulating the operation of buses in Massachusetts highways. These statutes are stated, construed and sustained by the full court of Massachusetts in *Barrows vs. Farnum's stage line*, and need not here be restated.

Interstate Bus Service Curtailed in New Jersey

Acting on the complaint of the Public Service Railway, Newark, N. J., the Board of Public Utility Commissioners has ordered the Pierce Coach Corporation to discontinue the transportation of passengers between points within the state in connection with the operation of a bus line between Morristown and Orange and New York. In the absence of municipal permits authorizing local service, the carrying of passengers whose journeys begin and end in New Jersey was held to be illegal.

Gasoline Tax Increased in Kentucky

The Kentucky Legislature on Feb. 20 passed a bill in which the gasoline tax is increased from 3 to 5 cents a gallon. It was approved with a wide majority in both the House and the Senate. The measure was recommended by the Governor. The law is to become effective at once and continue until July 1, 1928, provided no succeeding Legislature may change the time limitation. Other bills are before the state to increase license taxes on buses and taxicabs, on the basis of a seat charge, greater than that now in effect.

Cross-town Line in Fond du Lac.—The City Council of Fond du Lac, Wis., has accepted the proposition of the Wisconsin Power & Light Company to operate a cross-town bus line in that city. This bus system would work in harmony with the company's railway with interchangeable transfers. The application of the company was referred to in the *ELECTRIC RAILWAY JOURNAL*, issue of Feb. 13, page 299.

New Line to Run.—The Lordship Railway, Bridgeport, Conn., has been authorized by the Public Utilities Commission to operate a new bus line between Avon Park, Stratford, and Bridgeport, connecting with its present bus route from Lordship to Bridgeport. Two buses are now operated on a one-hour headway.

Line to Be Replaced with Bus.—The Southern Public Utilities Company, Anderson, S. C., plans to replace its line to North Anderson with bus service. The line to North Anderson has been in service since the development of the northern suburb began several years ago. It was not stated whether the line had been operated at a loss or not, but it was said that the bus would prove more beneficial to the residents of that suburb.

More Buses at Asheville.—Any day now seven new passenger buses costing \$11,000 each and seating 29 people will be put in operation in Asheville by the Asheville Light & Power Company. Some of the equipment will be put on the run between Asheville and West Asheville. The purchase brings the total number of buses owned and operated by the company up to nine. Decision to utilize buses rather than cars was reached after a conference with city officials in regard to the traffic situation.

Bus License Sought Again in Westfield.—The Springfield Street Railway is still seeking a bus license to operate in Westfield, Mass. The City Council has not yielded despite numerous meetings and long arguments. At least two members of that body are holding out for assurance that the railway will maintain one crosstown trolley line. The railway says such a line does not pay and will not promise to continue operating any line at a loss. To further the interest of the city of Westfield the Springfield company has signified its intention to replace all highways to the satisfaction of the highway department, if licenses are granted to operate buses.

Fare Increased from Eight to Ten Cents.—The Public Utilities Commission of the District of Columbia has authorized the Washington Railway & Electric Company to increase the fare on its Burleigh bus line from 8 cents cash, six tokens for 40 cents and 2 cents for transfers between intersecting car and bus lines to 10 cents cash with tickets sold at the rate of six tickets for 50 cents provided that a free transfer, good on any intersecting car or bus line of the company, be issued in payment of 10 cents cash fare or on payment of one ticket fare and 2 cents. Transfers to the Burleigh bus line will be issued by connecting car and bus lines for 2 cents only upon the payment of an 8-cent cash fare.

Financial and Corporate

\$1,043,401 Net Income for Chicago Rapid Transit

Company Operating Elevated Lines Reports Progress During 1925—Expenses \$199,600 Less than 1924

Gross revenues of the Chicago Rapid Transit Company, Chicago, Ill., for the year ended Dec. 31, 1925, representing combined operating and non-operating revenue, were \$19,281,887, an increase of \$505,954 over the previous year. Total expenses, including taxes and \$241,906 for retirement reserve, were \$14,967,509, or \$199,600 less than the year before.

Net earnings were \$4,314,378, an increase of \$705,554. Interest, rentals and amortization of discount totaled \$3,270,977, leaving net income of \$1,043,401, an increase of \$242,025 over the year 1924.

Dividends on the company's outstanding 7.8 per cent prior preferred stock were declared and paid to the extent of \$308,529, leaving \$734,871 as unappropriated surplus earnings for the year, no interest having been declared or paid on the company's adjustment debenture bonds. To this surplus should be added other net credits to profit and

loss of \$38,169 and the surplus of \$958,672 from the previous year, making a total surplus at the end of the year 1925 of \$1,731,713.

The rapid transit lines carried 216,045,575 revenue passengers in 1925, an increase of 3,144,551 compared with 1924.

One hundred new steel motor cars, ordered Dec. 19, 1924, were placed in service, the last of these being delivered on Nov. 23, 1925. These cars provide the maximum of comfort and safety and cost \$2,268,840. The company now has 1,906 cars in service, including 1,862 passenger cars, of which 456 are all-steel construction. For the last ten years the company has been purchasing steel equipment in anticipation of a subway being built.

In September, 1924, the company requested the city for permits to extend all station platforms so as to allow eight-car train operation, which would substantially improve the service. Permits were obtained from time to time, but it was not until the city passed an enabling ordinance on July 22, 1925, that authority to extend all platforms was secured. The work was started the day following the passage of this ordinance and has been carried on continuously ever since. The work of extending the platforms on the Loop, Ravenswood-Kenwood, Howard-Jackson Park, Lake Street and Garfield Park lines has been practically completed. On the Douglas Park, Logan Square and Humboldt Park lines extensions will be completed soon.

While the number of passengers carried on the elevated lines in 1925 showed an increase, the ill effects of the handicap of inadequate loop terminal facilities became increasingly apparent. The company put into effect the only remedy available to it in the extending of loop platforms to accommodate eight-car trains. This has proved of considerable benefit in the rush-hour periods, but far from meets the situation.

On Sept. 27, 1924, the company publicly announced its policy of extending and enlarging its service by formally requesting the City Council of Chicago for consent to construct about 40 miles of specified elevated extensions, estimated to cost approximately \$31,500,000. If such consent is obtained it is the company's intention to commence the work of constructing the extensions without delay and to complete the same as soon as practicable.

In addition the company, in order to obtain much-needed additional capacity for handling passengers in the central business district, has proposed to the City Council that if the city would build and grant the company the use of a rapid transit subway running from 22d Street north through the Loop district to North Avenue and connecting at both ends with the elevated lines, the company stood ready to enter into an agreement to pay to the city for the use of such subway a fair compensation

INCOME STATEMENT OF CHICAGO RAPID TRANSIT COMPANY FOR THE YEAR ENDED DEC. 31, 1925

Passenger revenue.....	\$17,786,474
Other transportation revenue.....	1,245,338
Gross operating revenue.....	\$19,031,812
Operating Expenses:	
Maintenance of way and structures.....	\$1,778,749
Maintenance of car equipment.....	1,444,216
Power.....	1,979,684
Conducting transportation.....	7,006,823
General and miscellaneous.....	1,135,721
Total operating expenses.....	*\$13,345,194
Net operating revenue.....	\$5,686,618
Taxes, city compensation, etc.....	1,622,314
Operating income.....	\$4,064,303
Non-operating income.....	250,074
Gross income.....	\$4,314,378
Deductions:	
Rentals.....	\$881,282
Interest on mortgage debt and equipment obligations.....	2,277,380
Other interest.....	155,498
Amortization of discount..	56,816
Total.....	\$3,270,977
Net income for the year 1925.....	\$1,043,401

SURPLUS ACCOUNT

Balance, surplus Dec. 31, 1924.....	\$958,672
Net income for the year ended Dec. 31, 1925 (as above).....	\$1,043,401
Less dividends paid on prior preferred stock.....	308,529
Surplus earnings for the year unappropriated.....	\$734,871
Miscellaneous debits and credits (net)...	\$1,693,544
Surplus, Dec. 31, 1925.....	\$1,731,713
*Total operating expenses include \$241,906.92 credited to retirement reserve.	
†No interest declared or paid on adjustment debenture bonds.	

either by way of fixed rental or a division of earnings. It is estimated the use of such a subway would enable the company, during the rush periods, to carry about twice the number of passengers it is now capable of carrying in such periods in and through the Loop.

On Nov. 16, 1925, work had progressed to the point where a considerable number of eight-car trains could be added to the service. The cost of this improvement, inclusive of platform extensions, changes in structure and car equipment and new equipment as previously stated, is \$3,322,063.

On March 28, 1925, rapid transit service was extended to Dempster Street, Niles Center, the Chicago Rapid Transit Company having leased trackage rights over the new Skokie Valley line of the Chicago, North Shore & Milwaukee Railroad. This new line extends westward from the Howard Street station of the Evanston division and north to Dempster Street, Niles Center, a distance of 5 miles. It is believed that the territory tributary to this line will be rapidly built up and that it will soon become a valuable addition to the company's system.

A trackage lease was negotiated with the Chicago, Aurora & Elgin Railroad under which rapid transit service will soon be extended over that railroad to additional western suburbs of the city, including Maywood, Bellwood and the new community of Westchester.

For the purpose of defraying the cost of the new cars and platform extensions above mentioned and other corporate purposes the company during the year sold \$2,212,000, par value, of first and refunding mortgage 6½ per cent gold bonds (series due 1944).

During the year the company paid off or acquired its underlying bonds and equipment obligations aggregating \$1,117,000. This includes \$231,000 first mortgage bonds of the Northwestern Elevated Railroad acquired for the sinking fund.

Attitude of Government on Non-Voting Stock

The government doubts if there is any way in which it can legally meet the situation visualized by Professor Ripley in his campaign against non-voting stocks. Sec. 240 of the revenue bill, having to do with the consolidated returns of affiliated corporations, was

before the Senate. The test of affiliation was a certain percentage of the voting stock. The Senate, by amendment, struck out the word "voting." High legal opinion is that this amendment resulted from the Ripley agitation and that "it will increase the tax difficulties of public utilities." Another view is that it sets up as a precedent the theory that the total stock is the test of affiliation, wherefore, in anti-trust suits, a similar test should lie, in which case unity of control through ownership of management, or "B" stocks would not be subject to attack if the "A" stocks were widely held. The argument seems a little far fetched, but it is worth noting.

Increase in Illinois Power & Light Preferred Stock

A special meeting of stockholders of the Illinois Power & Light Corporation was held on Feb. 23 for the purpose of submitting to the vote of the stockholders the question of increasing the authorized capital stock of the corporation by increasing the authorized par amount of the 7 per cent cumulative preferred stock from \$30,000,000 to \$40,000,000.

The sale of 7 per cent cumulative preferred stock of the corporation has been successfully continued during the past year to customers residing in the various communities in which the company's properties are located and through other channels, with the result that the present authorized amount of 300,000 shares of the par value of \$100 each has now been nearly all sold and issued. The increased amount can only be issued upon approval by the Illinois Commerce Commission and upon condition that net earnings are not less than twice the annual dividend requirement on shares now outstanding and to be issued, and that the assets of the company after deducting liabilities shall not be less than \$125 for each share, including the consideration to be paid for the new stock.

On Feb. 23 Blyth, Witter & Company, New York, offered \$2,000,000 of the 7 per cent preferred issue of the company for subscription at \$100 a share and accrued dividend. The balance for bond discount, depreciation and dividends in 1925 was \$5,403,301 compared with \$4,621,000 in 1924.

East Avenue Bus Operation at Rochester Unprofitable

The report of James F. Hamilton, president, for the year 1925 on the operations of the East Avenue Bus Company, a subsidiary of the New York State Railways, Rochester (N. Y.) lines, shows a deficit of \$4,495.

The net operating expenses exceeded the revenues by \$12,361, which, with taxes imposed, brought the net operating deficit to \$13,226. Offsetting this loss in part was the sum of \$10,290, which represents the non-operating income or the difference between the results of the operation of the Brown-croft line, a part of the company's system, and the return of the 8 per cent guaranteed under the company's five-year contract with the Browncroft Realty Corporation.

The East Avenue Bus Company operates the East Avenue line, purchased in 1924 from an independent company. This route connects the heart of Rochester's business section with the sub-

SUMMARY OF OPERATIONS OF THE EAST AVENUE BUS COMPANY, ROCHESTER

Operating revenues.....	\$44,666
Operating expenses.....	57,028
Net operating deficit	\$12,361
Taxes assignable to bus operation..	864
Operating deficit	\$13,226
Non-operating income	*10,290
Gross income	\$2,936
Deductions from gross income.....	1,558
Net deficit	\$1,495

*This item represents the difference between the results of operation of the Brown-croft Bus Line and the return of 8 per cent guaranteed under the five-year contract with the Browncroft Realty Corporation.

Figures in Italics denote deficit.

urban village of Pittsford, 10 miles to the east. It traverses East Avenue throughout, a street which for a mile is the center of the fashionable shopping district and thereafter the most exclusive residential street in Rochester.

The Browncroft line was established about a year ago, linking the business section with the exclusive subdivision of Browncroft, a 6-mile route. This line is patronized chiefly by well-to-do business men and their families and by late theater crowds, for whom special service is provided. At first a 25-cent

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Street Railway Fares* 1913 = 4.84	Feb. 1926 7.35	Jan. 1926 7.32	Feb. 1925 7.24	Feb. 1926 7.35	May 1923 6.88
Electric Railway Materials* 1913 = 100	Feb. 1926 155.3	Jan. 1926 154.3	Feb. 1925 153.1	Sept. 1920 247.5	Oct. 1924 148.5
Electric Railway Wages* 1913 = 100	Feb. 1926 223.8	Jan. 1926 223.8	Feb. 1925 221.0	Sept. 1920 232.0	March 1923 206.8
Am. Elec. Ry. Assn. Construction Cost (Elec. Ry.) 1913 = 100	Feb. 1926 201.9	Jan. 1926 202.2	Feb. 1925 203.9	July 1920 256.4	May 1922 167.4
Eng. News-Record Construction Cost (General) 1913 = 100	Feb. 1926 206.6	Jan. 1926 207.2	Feb. 1925 209.7	June 1920 273.8	Mar. 1922 162.0
U. S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Jan. 1926 156.0	Dec. 1925 156.2	Jan. 1925 160.0	May 1920 246.7	Jan. 1922 138.3

Conspectus of Indexes for February 1926

Compiled for Publication in this Paper by Albert S. Richey Electric Railway Engineer Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Bradstreet Wholesale Commodities 1913 = 9.21	Feb. 1 1926 13.72	Jan. 1 1926 14.01	Feb. 1 1925 13.89	Feb. 1 1920 20.87	June 1 1921 10.62
U. S. Bur. Lab. Stat. Retail Food 1913 = 100	Jan. 1926 164.3	Dec. 1925 165.5	Jan. 1925 154.3	July 1920 219.2	Mar. 1922 138.7
Nat. Ind. Conf. Bd. Cost of Living 1914 = 100	Jan. 1926 170.4	Dec. 1925 171.4	Jan. 1925 167.1	July 1920 204.5	Aug. 1922 154.5
Steel Unfilled Orders (Million Tons) 1913 = 5.91	Jan. 31 1926 4.883	Dec. 31 1925 5.033	Jan. 31 1925 5.037	July 31 1920 11.118	July 31 1924 3.187
Bank Clearings Outside N. Y. City (Billions)	Jan. 1926 19.63	Dec. 1925 20.20	Jan. 1925 18.59	Oct. 1925 20.47	Feb. 1922 10.65
Business Failures Number	Jan. 1926 2073	Dec. 1925 1628	Jan. 1925 2340	Jan. 1924 2231	Aug. 1925 1353
Liabilities (Millions)	48.23	43.11	64.44	122.95	27.22

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway opera-

tion and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 144 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

fare was charged with no stops. After a few months the company cut the fare to 15 cents and stopped buses on signal. The equipment is carried in the assets at \$73,091.

Deficits in Portsmouth Must Be Wiped Out

The Portsmouth Public Service Company, Portsmouth, Ohio, suffered a deficit of \$62,346 in 1925. This, added to the other deficits of the past three years, makes a total of \$137,374 reported to City Auditor Ralmadge Edwards. James F. Loftus, general manager, in a letter accompanying the financial statement, declared that unless there was some "material change" in the number of car riders the outlook for the railway, as a money-making investment, was "far from encouraging." With a view to reducing the loss, the company is considering a number of changes, among them one-man car operation. This new system will likely go into effect on March 1. The company operates 37 miles of line and charges 7 cents for fare. No change in this rate is contemplated during the present year.

Receiver Liquidates First Mortgage Issue.—The entire issue of \$500,000 Flushing & College Point Electric Railway first mortgage 5 per cent bonds due June, 1925, have been liquidated by the receiver of the New York & Queens County Railway, New York, N. Y. An order of the New York State Supreme Court authorized the receiver to pay not more than \$850 for each \$1,000 bond with all unpaid coupons attached. Fisk & Roberts, New York, negotiated the settlement with the bondholders, some of whom were represented by a protective committee.

\$159,176 Decrease in Net at Detroit

Extraordinary Expenditures for Repairs and Advance in Wages Cut Down Municipal Railway Earnings

During the year ended Dec. 31, 1925, the balance of net income of the Department of Street Railways at Detroit, Mich., was \$566,793, while for the year ended Dec. 31, 1924, it was \$725,969, a decrease of \$159,176. The balance of net income for the first six months of 1925 was \$306,623, while for the last six months it was \$260,169, but in the latter period \$257,787 more was expended for repairs to tracks and cars than was expended in the first six months of 1925. Of this amount \$102,207, is classed as extraordinary; another important matter was the increase in wage granted to the platform men, which amounts to about \$150,000 increase over what was paid in the first six months for like service performed. Had no more been expended on repairs in the last six months than in the first six months, the balance of net income would have been \$517,956.

The facts are taken from the financial statement of the Department of Street Railways of the city of Detroit, covering December, 1925, and the year ended Dec. 31, 1925, issued by W. M. Hauser, auditor. The system that has now been finally adopted by Mr. Hauser is to give the general balance sheet at the close of business on the last day of the month, and an income and statistical statement for the month compared with the corresponding month of the preceding year.

The balance of net income for December, 1925, is \$78,876, after the payment of sinking fund charges. The balance of net income for the month of December, 1924, was \$74,823, so that the past month shows an increase over

that for December, 1924, of \$4,052, or 5.4 per cent.

During the year ended Dec. 31, 1925, 481,236,694 passengers were carried by the rail lines and 10,951,951 by the coach lines, a total of 492,188,645 passengers, compared with a total of 458,540,992 for the year ended Dec. 31, 1924, divided 457,562,210 rail lines and 978,782 coach lines, so that the Department of Street Railways carried 33,647,653, or 6.8 per cent, more passengers in the year 1925 than in the year 1924.

Mr. Hauser points out that accrued depreciation has been provided in the accounts in the amount of \$3,179,111, equal to about 3 per cent a year on the value of the depreciable property. This amount represents a transfer from surplus to a separate account and is invested in property.

In considering the subject of depreciation it should be remembered that this account admits of several definitions and usages, depending upon the purpose of its use and the attitude of mind of the user. In point of fact depreciation implies a decline in value; that is, diminution of productive or net earning capacity, it is cited. Obsolescence or inadequacy are not results of age or upken, for the reason that a street car or any other physical unit of the property, regardless of its age or maintenance condition, may become obsolete or inadequate, or both, at any time when in the best of judgment of the owners it is unsuitable for the service required.

With reference to the operating reserves for injuries and damages, the amount has been adjusted to \$774,267; \$700,000 has been credited back to surplus. Price, Waterhouse & Company, in their report rendered on Nov. 9, 1925, on the accounts of the Department of Street Railways stated that "from the information so obtained the reserve as at June 30, 1925, is more than 100 per

INCOME AND STATISTICAL STATEMENT OF THE DEPARTMENT OF STREET RAILWAYS AT DETROIT

Income	Year Ended	Year Ended	Statistics	Year Ended	Year Ended
	Dec. 31, 1925	Dec. 31, 1924		Dec. 31, 1925	Dec. 31, 1924
Operating Revenue			Railway revenue car-miles.....	52,863,111	48,248,330
Railway operating revenue.....	\$22,413,689	\$21,678,906	Coach revenue coach-miles.....	3,529,795	157,540
Coach operating revenue.....	818,328	51,282	Railway revenue car-hours.....	5,692,190	5,267,176
Total operating revenue.....	\$23,232,017	\$21,730,188	Coach revenue coach-hours.....		
Non-operating income.....	184,273	141,766	Railway revenue passengers.....	357,926,168	346,116,298
Total revenue from all sources.....	\$23,416,291	\$21,871,955	Railway transfer passengers.....	123,310,526	111,445,912
Operating Expenses			Railway total passengers.....	481,236,694	457,562,210
Railway operating expenses.....	\$16,572,497	\$15,383,494	Coach revenue passengers.....	10,564,723	978,782
Coach operating expense.....	786,557	41,701	Coach transfer passengers.....	387,228	
Total operating expenses.....	\$17,359,055	\$15,425,195	Coach total passengers.....	10,951,951	978,782
Net revenue from all sources.....	\$6,057,235	\$6,446,760	Total revenue and transfer passengers.....	492,188,645	458,540,992
Deduct			Railway operating revenue per car-mile, cents.....	42.40	44.93
Taxes assignable to operation.....	\$705,615	\$716,616	Coach operating revenue per coach-mile, cents.....	23.18	32.55
Other deductions.....	935	105,548	Railway operating expenses per car-mile, cents.....	31.35	31.88
Interest on funded debt:			Coach operating expenses per coach-mile, cents.....	22.28	26.47
On purchase bonds.....	\$155,380	\$161,033	Railway operating revenue per car-hour.....	\$3.94	\$4.12
On construction bonds.....	785,875	785,875	Coach operating revenue per coach-hour.....		
On addition and betterment bonds and notes....	137,305	152,613	Railway operating expenses per car-hour.....	2.91	2.92
On purchase contract (D. U. R.).....	854,662	916,810	Coach operating expenses per coach-hour.....		
Total interest.....	\$1,933,224	\$2,016,332	Ratio of transfer passengers to revenue passengers—		
Total deductions.....	\$2,639,774	\$2,838,496	railway, per cent.....	34.45	32.20
Net income.....	\$3,417,461	\$3,608,263	Ratio of transfer passengers to revenue passengers—		
Disposition of Net Income			coach, per cent.....	3.66	
Sinking funds:			Railway revenue passengers per car-mile operated....	6.77	7.17
For purchase bonds.....	\$133,000	\$133,000	Railway transfer passengers per car-mile operated....	2.33	2.31
For construction bonds.....	571,351	565,654	Total railway passengers per car-mile operated.....	9.10	9.48
For addition and betterment bonds and notes....	358,798	396,121	Coach revenue passengers per coach-mile operated....	2.99	6.21
For purchase contract (D. U. R.).....	1,787,518	1,787,518	Coach transfer passengers per coach-mile operated....	.11	
Total sinking funds.....	\$2,850,667	\$2,882,293	Total coach passengers per coach-mile operated.....	3.10	6.21
Balance for the period.....	\$566,793	\$725,969	Ratio of railway operating expenses to railway operating revenue, per cent.....	73.94	70.96
			Ratio of coach operating expenses to coach operating revenue, per cent.....	96.12	81.32

cent in excess of the indicated requirement at that date."

In view of this it has been found proper, the auditor states, to effect an adjustment in this account. Claims paid and charged to the reserve account during the period from Sept. 1, 1921, to June 30, 1925, amounted to \$582,001, while claims paid since July 1, 1925, to Dec. 31, 1925, amounted to \$194,411, of which \$134,881 was for accidents prior to June 30, 1925, and \$59,529 for accidents subsequent to July 1, 1925.

While up to June 30, 1925, it was not the practice of the Department of Street Railways to set aside funds for the specific purpose of liquidating claims for injuries and damages, the basis of accounting has now been changed in this respect and appropriations of cash are now being made for the purpose of liquidating liabilities of this nature. At Dec. 31, 1925, \$106,758 had been set aside in cash, so that of the \$774,267 shown as reserved \$106,758 is actually set up in cash.

The balance of net income at Detroit for January, 1926, is \$56,698 after the payment of sinking fund charges. The balance of net income for January, 1925, was \$52,551, so that the past month shows an increase of \$4,147, or 7.9 per cent over January, 1925.

During January, 1926, 43,162,941 passengers were carried by the rail lines and 1,692,191 by the coach lines, a total of 44,855,132, compared with 40,145,926 in January, 1925, divided 39,889,805 rail lines and 256,121 coach lines. In other words, 4,709,206, or 11.7 per cent, more passengers were carried in January, 1926, than in January, 1925.

The five years of operation at Detroit since Feb. 1, 1921, is summed up by Mr. Hauser, auditor of the department, as follows:

In five years \$45,327,701 was provided for capital cost. Of this amount \$41,080,000 was provided by vote of the electorate now represented by \$37,131,000 debt, \$3,949,000 having been paid off from earnings. The sum of \$4,007,971 was provided out of earnings, of which \$3,691,113 represents accrued depreciation, the accrual being invested in property. The amount of \$316,868 shown as profit and loss balance and \$239,729 received from the sale of property go to help make up the total amount of \$45,327,701, which is represented in the capital costs as follows:

Of the amount of \$45,560,410, \$44,293,545 represents road and equipment, \$114,600 working funds and \$1,152,264 material and supplies. In other words, the system fully equipped to do business has cost \$45,560,410. This amount is in excess of the provisions made for it by \$232,708. It represents the amount that the current and working liabilities are in excess of the current and working assets.

All sinking fund and operating reserves and interest requirements are funded 100 per cent, and specific cash and securities are now carried in funds to protect the sinking fund and operating reserves and interest requirements up to and including Jan. 31, 1926. In the case of the reserve for injuries and damages, the diversion of these funds by the former management for construction purposes has been replaced and made good.

The close of five years finds the department with the following:

Sinking fund, consisting of cash and securities for debt purposes	\$5,392,290
Special deposits, consisting of cash for interest purposes....	409,720
Insurance and other funds, consisting of cash for:	
(a) Injuries and damage purposes	798,845
(b) Repairs and renewal purposes	30,000
Total	\$6,630,855

Outlook for Iowa Interurban Improved

The protective committee representing the holders of the first mortgage bonds of the Waterloo, Cedar Falls & Northern Railway, Cedar Falls, Iowa, has submitted to the bondholders a three years condensed comparative statement of operations of the company, as follows:

	1925	1924	1923
Gross earnings.....	\$827,353	\$860,308	\$896,104
Operating expenses	750,899	792,602	828,385
Taxes	48,166	38,612	38,659
Net income applicable to first mortgage bonds	\$28,288	\$29,093	\$29,060

The amount necessary to pay the annual interest on the outstanding \$5,773,000 first mortgage 5 per cent bonds is \$288,650.

The committee says that while on the surface the net income in 1925 was less than that of 1924, it is significant that the last quarter of 1925 showed a gross increase of \$23,835 over the similar period of 1924, which encourages the hope that business conditions in Iowa—long depressed—have at last turned the corner. Earnings in January, 1926, exceeded those of December, the best month of 1925.

Long continued unfavorable business conditions in the territory served by the company, combined with aggressive bus competition, the general use of the automobile, and a falling off in coal and grain freights, are advanced as reasons for the decrease in gross earnings, while the high cost of operation and necessary outlays for maintenance, together with the necessity for meeting accumulated taxes and equipment obligations, have reduced the net income to about one-tenth of the amount required to pay the first mortgage bond interest. These considerations explain why the committee has thus far been unable to submit to the bondholders a plan of reorganization.

Up to date there have been deposited with the protective committee \$5,188,000 out of a total of \$5,773,000 outstanding first mortgage bonds and \$2,170,000 out of a total of \$2,333,000 outstanding common stock.

Receiver Appointed at Rockford

Adam Gschwindt, general manager of the Rockford Electric Company, was appointed receiver for the Rockford City Traction and Rockford & Interurban Railway, Rockford, Ill., under action instituted recently by trustee for bondholders of the two systems. Mr. Gschwindt has announced that his general policy will be to abandon profitless interurban lines and gradually to separate them from city lines, but there will be no immediate change in operating policy of the city lines. It was generally understood that the receiver had reference to the Rockford, Beloit & Janesville and Rockford & Freeport interurbans as lines to be abandoned. The receivership followed default of the interest payment on \$1,650,000 of bonds, but bondholders are reported to have assured Mr. Gschwindt that they stand ready to

back such improvements as he may determine. The Rockford Electric Company is one of the largest creditors of the traction systems. There was no opposition to the court's selection of the receiver.

New Directors in Alliance.—New directors of the Stark Electric Railroad, Alliance, Ohio, were chosen recently as follows: N. F. Glidden, Howard Morris of New York, James Bertran, W. S. Chittenden, L. W. Popp, E. W. Sweezy, O. K. Ayers and Charles Sebring.

Electric Plant Acquired.—Announcement has been made of the purchase of the Marengo Public Service Company, an electric company of Marengo, Ill., by the Illinois Northern Utilities Company, Freeport, Ill. R. T. Fry, Marengo, has been in charge of the local plant. The purchaser will take possession on March 1.

Companies Consolidated. — Seven companies which have been operated as subsidiaries of the Wisconsin Public Service Corporation have been consolidated with the main system and will conduct all business as the Wisconsin Public Service Corporation. Included in the group are the Green Bay Park Railway, serving Bay Beach Park and the River View Motor Bus Company, supplying interurban service between De Pere & Green Bay and city service in Manitowoc.

Receiver Sought.—Suit asking that the Indianapolis, New Castle & Eastern Traction Company, Anderson, Ind., be placed under control of a receiver and that Arthur W. Brady, present receiver of the Union Traction Company of Indiana, be named receiver, has been filed in the Circuit Court at Muncie, Ind., by the Fidelity Trust Company, trustee, holder of bonds aggregating \$1,500,000 issued in June, 1912. The action was ordered transferred to Anderson, Ind. The Indianapolis, New Castle & Eastern Traction Company is operated under lease by the Union Traction Company.

Authorized Issues Under 1924 Amount.—During the twelve months ended Dec. 31, 1925, the California Railroad Commission authorized the issue of \$132,036,749 of stocks, bonds, notes and other evidences of indebtedness. The total issue was below the amount for the last few years, \$237,875,848 having been authorized in 1924 and \$196,802,936 in 1923. Electric railway issues totaled \$3,610,461 in 1925 compared with \$13,067,496 in 1924.

City's Share Lower.—Ralph E. Carley, manager of the western division of the Illinois Power & Light Corporation, supplying Quincy, Ill., with traction service, recently submitted a report of the finances of the company's operation in that city, under terms of the ordinance which requires payment of 2 per cent of the gross earnings annually. The 1925 payment to the city was \$5,226 from \$261,343, the company's gross, which included \$252,350 from street car lines and \$8,993 from buses. Comparisons show a gradual and continued decline in earnings since 1920, when the city's share was \$6,443; 1921, \$5,682; 1922, \$5,456; 1923, \$5,470, and 1924, \$5,238.

Personal Items

J. R. Ong at Cincinnati

Former Railway Consultant Placed in Charge of New Department of Street Railway

Creation of a new department, to be known as transportation engineering, in charge of Joe R. Ong, has been announced by Walter A. Draper, president of the Cincinnati Street Railway, Cincinnati, Ohio. For several years Mr. Ong has resided at Piqua, Ohio, where he has engaged as a consulting electric railway transportation engineer. In his new capacity he will have charge of all traffic surveys, the making of schedules and will devote considerable time to studies in economies of operation. He also will have charge of general statistical data of an operating nature.



J. R. Ong

Mr. Ong has made a number of exhaustive traffic surveys in different parts of the country which have brought him into prominence as a consulting engineer. Notable among these was his work in Los Angeles, Cal.; Winnipeg, Canada, and Atlanta, Ga. He goes to the Cincinnati Street Railway with a record of accomplishments in all undertakings in which he has been identified. He has already assumed his new duties and is co-operating with J. B. Stewart, Jr., general manager, in working out a plan to secure the contemplated results of the new department.

From 1911 to 1912 Mr. Ong was superintendent of substations and assistant electrical engineer for the Fort Dodge, Des Moines & Southern Railroad, with headquarters at Boone, Iowa. The following year he assumed the duties of electric railway engineer, serving jointly the Railroad Commission of Wisconsin and the Tax Commission of that state on appraisals of public utility properties and in traffic and service studies on street railway properties in Milwaukee and other cities of the state.

In 1918 he became electric railway transportation engineer for the Board of Control of the Kansas City Railways and from 1919 to 1920 held a similar position with the Winnipeg Electric

Railway, Canada. The following year he became electric railway transportation engineer for the Georgia Railway & Power Company, Atlanta, Ga., and held that post until 1923, when he became a consulting engineer with headquarters at Piqua. In that capacity he made an exhaustive survey for the management of the Los Angeles Railway and studies in economies of operation for a number of other electric railways throughout the country.

Before going to college Mr. Ong served with the Indianapolis & Cincinnati Traction Company and the Chicago, Lake Shore & South Bend Railway. His first work after leaving college was done for the Westinghouse Electric & Manufacturing Company at its main plant in East Pittsburgh. Later he was transferred to the company's Philadelphia sales office.

Mr. Ong was born at Columbus, Ind. He was graduated from Purdue University in 1909 as an electrical engineer.

E. M. Hervey in Consulting Work

E. M. Hervey, connected with the Wisconsin Power & Light Company as manager of its Sheboygan electric and railway properties for the last three years, has resigned to enter business for himself as a consulting engineer in the power transmission field. In that work he has specialized for the past twenty years. Prior to his promotion as manager Mr. Hervey was the company's electrical engineer at Sheboygan.

Personnel Changes in Dayton

The annual meeting of the stockholders of the City Railway, Dayton, Ohio, was held on Feb. 11. As the company personnel is now constituted the officers are: J. M. Markham, president, whose election was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Feb. 20; H. S. Mead, vice-president; W. S. W. Edgar, secretary, and T. A. Ferneding, treasurer. The directors are: W. S. W. Edgar, T. A. Ferneding, J. M. Huffman, W. H. Kuhlman, J. M. Markham, H. S. Mead and V. Winters.

Thomas E. Howell remains as general manager and Edward H. Hartman continues as superintendent of transportation.

L. P. Fessenden Manager at Sheboygan

L. P. Fessenden, chief engineer and superintendent of the Sheboygan central station since 1912, has been selected to succeed E. M. Hervey as manager of the Sheboygan electric and railway properties of the Wisconsin Power & Light Company. Mr. Fessenden's responsibilities at the same time will be widened to include the district managership of all the company's properties in Sheboygan and Plymouth.

F. A. Richards Vice-President and Sales Manager American Car

Ford A. Richards, sales manager of the American Car Company since 1918, has been honored by the directors by also being elected to the vice-presidency. As sales manager Mr. Richards has enjoyed a wide acquaintanceship, particularly throughout the territory west of the Mississippi River, covered by his company for the Brill organization.

His affiliation with the electric railway industry dates back to 1898, when he entered the employ of the Peckham Manufacturing Company, then builder of electric railway trucks. During the intervening 28 years he has been engaged in various capacities, including that of assistant to the vice-president and foreign sales manager of the Peckham company and later as a member of a partnership under the name of the J. A. Hanna Company, formed to promote the sale of both cars and trucks.

Mr. Richards joined the Brill organization in 1909 as Pacific Coast sales



F. A. Richards

manager with headquarters in San Francisco. He continued in this capacity until 1918, when he was transferred to St. Louis as sales manager of the American Car Company, which had become a Brill subsidiary in 1904.

As vice-president and sales manager Mr. Richards will continue, just as he has in the past, to devote his attention to the problems of the industry in that part of the country where he is so well known.

A native of Ohio, Mr. Richards was educated at the Uniontown High School, from which he was graduated in 1893, and at Mount Union College, Alliance. It may well be said that he has devoted his entire business life to the electric railway and affiliated manufacturing industries. His success is attested by his recent promotion.

Ernest Hatton has resigned as general manager and engineer of Newcastle-on-Tyne Corporation Tramways, owing to ill health. The municipality received the news with great regret. Mr. Hatton has held the post since 1905. During that period he has been responsible for carrying out important developments of the system. Before he went to Newcastle he occupied a similar position at Salford and was in

charge of the work of electrifying the horse tramways there. Under his charge the Newcastle tramways have shown highly satisfactory financial results.

C. R. Harte A.E.R.E.A. Head

Impressive Career of Connecticut Company Engineer Dates Back to 1893
—Active in Association Work

Charles Rufus Harte, who has succeeded Roy C. Cram as president of the American Electric Railway Engineering Association, has been connected with the New York, New Haven & Hartford Railroad and the Connecticut Company continuously since 1893 except for a short period during 1901-04. All his life Mr. Harte has been active on the firing line. He has gone from one big construction job to another until one marvels at the capacity of the man to carry on uninterruptedly for so many years. He was really drafted into electric railway work as a result of the New York, New Haven & Hartford taking over the trolley lines in Massachusetts and Connecticut, and he had foisted upon him engineering and other problems which he himself readily admits he could not have solved had it not been for the co-operation of the officers of the company, notably Messrs. Storrs and Punderford, and his immediate associates.

It would, indeed, be interesting to recount each of the man's achievements, but it is impossible to do more than to indicate them by giving the facts with respect to the various positions he has held. As the bare biographical data are disclosed the background will unfold itself not only to the engineer but to the non-technician. The degree of appreciation of the work of the man will vary between the two sets of readers, but each of them will finish with a keener realization of the abilities of the new president than he had before.

Mr. Harte was graduated from Columbia University School of Mines with the degree of civil engineer in 1893. He at once entered the construction department of the New York, New Haven & Hartford Railroad, being employed from 1893 to 1901 in positions of steadily increasing responsibility on the four-tracking and elimination of grade crossings between New Haven and the Housatonic River; on the elevation of the Providence Division and the new four-track connection, including the Back Bay station from Dartmouth Street to the South Station, Boston, and on the double-tracking of the Naugatuck Division from Derby to Naugatuck.

In 1901 he accepted a position with Stone & Webster. For them he put under construction the 33-mile urban and interurban electric railway at Sydney, N. S., extending into the adjacent mining settlements and to Glace Bay. This work included the construction of a power house and carhouse. For the same firm he supervised work on the heavy interurban extension from Terre Haute to Clinton, Ind.

He returned to the New Haven in 1904 and was placed in charge of the extensive improvements at New Haven. He developed the plans and started this

work, but in 1906 he was placed in charge of the immense trolley construction program of the New Haven. In the four years that followed he supervised work on more than 100 miles of interurban type of trolley, the electrification of 50 miles of steam railroad track and the construction of more than 150 miles of transmission lines, together with power houses and substations, carhouses and miscellaneous structures. One of the carhouses included in this program of expansion was that at James Street, New Haven, with a capacity of 400 45-ft. cars. So far as is known, this was the largest single carhouse built up to that time.

In 1910, with the establishment of the



C. R. Harte

Connecticut Company as the trolley holding and operating subsidiary of the New Haven Railroad, Mr. Harte was transferred to it with the title of construction engineer, a position he has since held. Not long thereafter opposition began to develop to the New Haven's policy of developing the electric railway system to feed the steam road. When this opposition culminated in the separation decree of 1914, the construction program was correspondingly cut down, and the work of his department has been largely directed toward valuation, real estate and tax matters. Under the department, however, there was designed and built, among other things, the New Haven bus garage, one of the most up-to-date and best equipped electric railway garages.

Meanwhile the lack of any specification for overhead construction led to an immediate study by Mr. Harte along this line and the development of specifications which are the basis of the present A.E.R.E.A. standards, a result due very largely to the fact that manufacturers of material and contractors for its erection were invited to assist in the preparation of the code and did so.

Reverting to Mr. Harte's association affiliations he has been an active member of the A.E.R.E.A. since 1910, in which year he was a member of the committee on power distribution. Later he served two years as its chairman. He has been president and sponsor of the A.E.R.E.A. committee on heavy electric traction, joint sponsor of the engineering-accounting committee of that association and chairman of the standards committee of that association.

He is senior electric railway representative on the American Engineering standards committee, American inductive co-ordination committee and the committee on revision of the national electrical safety code. He is vice-chairman of the A.E.S.C. and chairman of the rules committee of the A.E.S.C. He is electric railway vice-chairman of the American induction co-ordination committee. In addition he is a member of the A.E.R.E.A., American Society of Civil Engineers and an associate member of the A.I.E.E. Particularly in his work for the American Electric Railway Association Mr. Harte has striven to bring about the acceptance of standard practices. One of the things that he proposes to do in his new office is actively to promote the wider general application of the standards that have been evolved.

Journal Staff Expanded

Both the business and editorial staffs of *ELECTRIC RAILWAY JOURNAL* are strengthened by changes in the organization of the transportation unit, which comprises the *JOURNAL* and *Bus Transportation*.

L. F. Stoll, who has been sales manager of the engineering group of McGraw-Hill papers, comprising *Engineering News-Record*, *Coal Age*, *Chemical and Metallurgical Engineering* and *Engineering and Mining Journal-Press*, has been transferred to take executive charge of the transportation unit with the title of assistant vice-president.

Charles Gordon has been relieved of other duties in order to take direct charge of the editorial staff of *ELECTRIC RAILWAY JOURNAL*, with the title of editor. Morris Buck will continue as managing editor.

David Cameron, formerly sales manager of the two transportation papers, has been made a member of the advertising counselors' staff of the company.

T. F. Mueller is transferred from field work in the Detroit territory to the position of assistant sales manager in New York.

R. A. Feldon has joined the business staff as advertising representative in the Detroit territory.

These changes are part of a broad program for expanding the *JOURNAL*'s service to its industry.

C. D. Foltz Westinghouse Representative in Chicago

C. D. Foltz, representative of the Westinghouse Air Brake Company in charge of the Denver and Salt Lake City offices, has been appointed assistant western manager of the company, with headquarters at Chicago.

When only fifteen years old Mr. Foltz entered railroad work as a telegraph operator on the Wabash. In 1910 he became an inspector for the Westinghouse company in Salt Lake City and was afterward promoted to mechanical expert and representative at that office. In this position his field of activity was widened by the inclusion of the Denver office. His headquarters were moved from Salt Lake City to Denver during the year 1923.

Tom Elliott Talks on the Electric Railway Outlook

Vice-President and General Manager of the Cincinnati Car Company Places Responsibility for the Future on Both Manufacturers and Operators—Holds Unlimited Power Available to Be Chief Cause of Heavy Equipment

AN INTERVIEW

By Charles Gordon

THOMAS ELLIOTT, vice-president and general manager of the Cincinnati Car Company, stands today with a background of experience that rivals fiction in its romance and typifies the rugged road over which many of the outstanding figures in the industry have traveled. Though entitled to rank as a veteran, he has retained a freshness of viewpoint and an enthusiasm that belie the marks which pioneering years have left.

His accomplishments as a car builder are too well known to require repetition. He has been a courageous advocate of light-weight construction and has consistently sought improved designs to give strength without excessive weight. Some of the outstanding installations of light-weight equipment that have made enviable records in reduced operating and maintenance costs have been the products of his enterprise.

I had frequently discussed the subject of car development with Elliott, but not for publication. Now that he had consented to an interview, I sought to sound the keynote of his thinking on structural design. My first question was fortunate in the sense of the response it provoked.

"What has constituted the greatest limitation to car construction development?" I asked.

"Lack of necessity and incentive," was the prompt reply. "There has been available with electric power an almost unlimited source of energy. Cars have consequently been merely assembled rather than scientifically designed. Excessive weight and high operating cost have been the result.

"As a mechanical and economic proposition," he continued, "transportation of people by rail is cheaper than on the highway, except when traffic is so extremely light that the investment in track is not justified. In view of the development of automotive vehicles and the rapid improvement of the bus, the time is getting short for railways to bring their properties up to date and for manufacturers to save their businesses by further improvement of their products. The opportunity will not continue indefinitely. Electric railways must be brought up to the modern idea of good transportation service."

This was, indeed, a frank statement on conditions in the industry. But Tom did not stop there. I had broached a subject in which he was keenly interested, and before I could put my next question he took me back a jump.

"Take the bicycle," he said. "In its day it was the finest designed and built transportation machine of which we



Thomas Elliott

have an example. It was largely instrumental in introducing the development of anti-friction bearings. Early bicycles weighed 175 lb. In their final form they were developed to the point where a 17-lb. vehicle carried a 200-lb. man with ease. This development took place when high grade material was scarce, but dependence on human motive power forced progress, because the bicycle which was easiest to propel was easiest to sell."

Thus we traveled back in mind to a period beyond the advent of the automotive vehicle to the beginning of modern individual transportation ma-

chines. It is a habit Tom Elliott has of drawing illustrations for the analysis of modern problems from a sometimes forgotten experience of the past.

But despite this practice of drawing on past experience, he would not tell me his age. Nor would he allow me to guess it except on condition that I first matched my skill against his on fairway and green. But I knew his hobby and something about his score. Consequently I decided to omit his age. I can, however, record that he was born on a farm in the north of England. He landed his first job in the United States with the Hazzard Manufacturing Company at Wilkes-Barre, Pa. This company manufactured wire rope and cable. In those days wire rope for the propulsion of cable cars was coiled in continuous lengths on several flat cars for shipment. It was in one of these gangs that Elliott, with much ambition and little experience, entered what in an indirect way was a part of the transportation business.

For several years following he was employed in the shops of the Lehigh Valley Railroad. About 1888 he went to Tennessee to run a mine locomotive. He was delighted with the job, but it lasted only a week. His natural curiosity to know all about any piece of machinery with which he comes in contact led him to examine the inside of the boiler, and the next day he decided to look for work with a more attractive future.

Following this his experience was varied. He worked in a roundhouse at night. Then he took a job with the Knoxville Car Wheel Company. Later, a brief experience in dredge boat construction was brought to a sudden end by a flood which occurred on the Tennessee River.

As I proceeded to marshal my questions to draw out expressions of opinion, my mind reverted frequently to those early days of the Tom Elliott who now sat before me, still mentally objecting to the procedure of an interview for publication. But my interest lay largely with the future. I wanted his views on current tendencies and trends. So I asked about the status of the interurban roads of the country, which some people have claimed are headed for the scrap pile.

"There is no question but that they fill a fundamental need," he said. "Except in those instances where the lines were unjustified in the first place and should never have been built, they can be put on a profitable basis."

"Does properly designed light-weight equipment afford ample safety and comfort for average interurban condi-

***T**HIS is the second of a series of interviews with the heads of car building plants and other prominent manufacturers. Rapidly growing interest in the improvement of electric railway equipment throughout the industry makes the views of these manufacturers particularly significant at this time. An interview with Samuel M. Curwen, president of the Brill Corporation, was published last week.*

tions," I persisted, wishing to draw him out further on this topic.

Apparently my question was well directed and touched on a subject to which he had given much careful thought. Tom leaned across the corner of his desk, and though he spoke deliberately, as is his custom, he raised his voice slightly and answered without mincing words.

"One of the reasons for the heavy cars operated on some interurban lines is the fear and dread of assuming the responsibility of our own convictions that is inherent in all of us. This has resulted many times in blind adherence to weight, not because it has been proved that heavy cars are safer in a collision or derailment, but rather because this has generally been considered as justification for relief from responsibility."

I was impressed by this answer. Here was the basis on which Tom Elliott has built many light cars for interurban service—some for operation at speeds up to 60 m.p.h. I began to probe deeper for some of the earlier experiences and associations that lay behind this courageous statement.

WON TO ELECTRIC TRACTION

It was while working as master mechanic and chief engineer of a cotton mill in Knoxville that Elliott began to hear about strange experiments on electric cars in Scranton. He listened at that time with a mixture of skepticism and interest. It may have been his early association with local transportation in the cable coiling days, or merely that strange fascination which the romance of transportation weaves, but in any event Tom continued to follow the news of these experiments.

W. G. McAdoo, later Secretary of the Treasury in Woodrow Wilson's Cabinet, bought the horse car lines in Knoxville and began to electrify them. Elliott watched with particular interest the construction of the power house. When the first car was finally operated under the new power in the streets of Knoxville he was convinced that he wanted to be a part of this new industry. M. R. McAdoo, brother of the owner, was the manager of the railway. Tom hunted him up and landed a job running the power plant.

That did not keep him busy long. With characteristic thoroughness he soon had leaky steam pipes tight and commutators bright. The job of welding an oil can looked like only a side line to one with as many ideas as Elliott. He bought a lathe and set it up in the engine room. Later he fixed up a brass furnace in one corner and started casting and finishing trolley wheels. Soon he began to rewind motor armatures in the power house. Ultimately, all of the car repair work was turned over to him.

In 1891 Elliott went to Atlanta with McAdoo. Here, two years later, he used what were then, so far as he knew, the first solid gears applied to car axles without keys. Some time later he began to build cars in the Atlanta shop. On the first of these the width of the customary side sill plate was increased from 6 in. to 18 in. In 1896 this plate construction was extended to the belt rail to form the

continuous side girder type of construction that is even now so generally used. The idea came from watching a repair man who used a wide plate to cover a gash in the side of a car.

During this early car building experience Elliott began to favor the use of steel as a material for increasing strength and reducing weight in cars. On the interurban line operated at that time by the Atlanta company the single-truck cars had proved unsatisfactory from the standpoint of riding qualities and ability to stay on the track at satisfactory speed. Tom built some double-truck cars. As cars go today, they were heavy. They had four 50-hp. motors each, but their excessive weight made it impossible to run them to the end of the line due to the limited distribution copper available. "Here," Tom says, "was born a high regard for the importance of weight reduction in cars."

Having again thus built up the background, I swung once more to present-day conditions.

"Is there any difficulty in financing purchases of new cars where a railway is otherwise limited in its ability to sell its securities?"

"There is no difficulty. Proper financing arrangements for cars can be readily consummated."

Still I was not satisfied.

"Do you have any difficulty in disposing of electric railway equipment trust paper?"

"None whatever."

There were no qualifications in these answers; thus encouraged, I put my next question.

"In your opinion, does demand for individuality or inertia on the part of railway managements stand in the way of car development?"

RAILWAYS AFTER IMPROVEMENTS

"My experience has been that railway managements are eager for new developments and that they will take any good scheme—and half of the bad ones—suggested by a car builder. They are looking for improvement and are willing to assume a large part of the trouble and expense of experimenting with new developments. The railways are hungry for new ideas."

Thus Tom Elliott proceeded to explode any assumption that operators are not interested in new developments advanced by the manufacturers. He had told me before this of his experience back in the days when the mechanical men in operating companies frequently worked with the crudest of facilities. Consequently, to me, his optimistic outlook on the demand for development was refreshing.

There are interesting anecdotes of Tom's early experiences as a master mechanic in Atlanta. When he first went to work there he found that the master mechanic was provided with a stable, several horses and a negro driver. Elliott had little use for these trappings of Southern luxury. He decided that the stable would make a good foundry. Acting on this idea, he succeeded in buying an old cupola for \$35, incidentally including in the bargain a three-chime steamboat whistle, worth at that time about \$200. He used trainmen apprentices who were sent to the

shop for instruction to move his cupola and set it up. When the general manager discovered the character of training his new platform men were receiving Tom lost a fine source of cheap labor. He finally rigged up the cupola with an old railway motor and a good housing for a blower and began to make chilled iron wheels that had a life varying from three weeks to five years. Sand for molds was dug in a lot near the foundry.

Elliott left Atlanta in 1901 with M. R. McAdoo and went to the West Penn Railway, first as superintendent of motive power and later as manager. In 1903 he accepted a position with the Cincinnati Traction Company, some two years after W. Kesley Schoepf had taken charge of the property as president. Tom was chief engineer in charge of car maintenance, overhead line and power stations.

A short time before the Cincinnati company had started building cars in its new shops, a plant much larger than was needed for maintenance work alone. Tom became engaged in many outside jobs for his superiors, in addition to his regular duties. He was frequently brought into contact with the car building plant. Finally he was delegated to find a man to take charge of car building. After ten days, without success, he was called into the office and given the job himself. As a result he began devoting his entire attention to the car plant.

CO-OPERATION NEEDED BY BUYER AND BUILDER

I asked Elliott whether, in his opinion, operating railways are justified in building their own cars under present conditions. There are several interesting thoughts in his reply.

"This depends entirely upon whether they can build a better car than they can buy. It is apparent that an operating management never makes its reputation by car building. Its primary job is to give good transportation service. When it engages in the work of building cars it diverts the attention of much of its personnel from operation and maintenance to manufacturing. Proper co-operation between operating companies and the car builders will result in better equipment than either can produce alone. Car builders are more familiar with the engineering features of design. Operators have the necessary experience to suggest improvements that make equipment popular with passengers and low in operating and maintenance cost.

"One primary disadvantage in a railway company building its own equipment," he continued, "is that it does not get the benefit of the constructive criticism of other operators that is freely made to car builders."

Here seemed to be good thinking, unbiased by commercial expediency. It suggested another question.

"What, in your opinion, is the life of electric railway cars?"

"With proper maintenance, their life is indefinite. Retirement will take place due to factors outside the cars themselves. These include more suitable dimensions and operating and maintenance economies made possible by improvements in design, to say nothing

of increased attractiveness of new equipment resulting from development of the art. These factors, rather than the actual wearing out of the cars themselves, will dictate replacements."

Tom had shown throughout our discussion a definite tendency to place on the shoulders of the manufacturers themselves a large part of the responsibility for the future progress of the industry. As we came to the final ques-

tion on the outlook for car building business in 1926, he maintained this position by summarizing his viewpoint in these words:

"There is now an active demand for new and improved types of cars. The extent of the business that will be placed during the year 1926 is largely dependent upon the efforts exerted by car builders to develop and sell their products."

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Bids Asked for 300 Cars and 150 Buses at Detroit

Awards impend at Detroit for more than \$4,000,000 of car and bus equipment. H. U. Wallace, general manager of the Department of Street Railways at Detroit, Mich., has emphasized to the Board of Street Railway Commissioners the urgent need of the department for additional equipment. In a letter to the board on Feb. 22 Mr. Wallace said that every unit owned by the Department is now in constant service and in addition the department is renting 50 additional motor cars and trailers from the Detroit United Railway in an effort to meet the heavily increased demand for service. In spite of these efforts, however, the service falls short of adequately filling the demands. According to Mr. Wallace, at the present time the city system needs at least 100 additional cars.

He says that approximately 150 of the cars now operating are so worn out and obsolete that their operation represents a current liability in the form of excessive maintenance and upkeep costs. These cars should be scrapped immediately and replaced. Furthermore, the department will need an additional 150 street cars or large buses to meet the future demands of next fall and take care of the rapid population and territorial growth of the year.

Mr. Wallace says that in considering the motor coach problems it is apparent that the city system will need 75 additional large buses to handle present business satisfactorily and on a conservative estimate will require 50 more buses to establish additional routes in certain sections of the city which are urgently in need of transportation facilities.

In consequence he has recommended that the city advertise for prices and terms on the following equipment: 300 new street cars, with six months option on 150 additional cars; 150 new large double-deck buses, with six months option on additional buses.

Mr. Wallace says:

As soon as we get these bids we will be able to determine what kind of terms we can get on the purchase of this equipment, and after obtaining the terms we can then definitely decide on the amount of equipment to purchase at this time.

From various conferences that we have had with bus manufacturers and car manufacturers we have been led to believe that

we will be able to procure equipment on terms that will permit of our paying for all of this equipment either out of the earnings from the equipment or out of the saving that we can make in the cost of operating new, light, modern cars in place of our present heavy and obsolete units.

The board has approved the request made by Mr. Wallace and the Department of Street Railways advertised on Feb. 24 for bids for the equipment mentioned by the railway manager in his letter. The awarding of the contracts is of course subject to approval by the City Council.

Brill Report Misquoted

In the digest of the report of the J. G. Brill Company published in the ELECTRIC RAILWAY JOURNAL for Feb. 13, page 307, the item of cost of operation was misstated due to the transposition of the figure of \$560,938. The paragraph in which this figure appeared as contained in the report and as it should have been presented in the JOURNAL read:

After deducting from earnings all cost of operations, including maintenance and repairs and depreciation for the year amounting to \$560,938 and after setting aside out of earnings reserve for federal income taxes, not yet due, of \$32,791, the result of the operations of all the plants of your company shows a net profit for the year of \$571,269.

Ohmer Company Is Active

With its factories working day and night in an effort to keep the total of unfilled orders to a minimum, the Ohmer Fare Register Company, Dayton, Ohio, reports the volume of sales for the month of January to be considerably greater than any previous month in its history. More employees are engaged at the present time than has been the case since the close of the war. As compared with this time last year, there is an increase of 30 per cent in the number of men employed.

January was also the biggest month for export business in the history of the company, it was reported. Many large orders were received from Australia, New Zealand, South and Central America, England and Canada. The new types of ticket-printing fare registers for electric and steam railroad companies and motor bus lines, which were recently announced, are attracting attention from transportation officials throughout the world, and are

being manufactured in increasingly largely numbers. It is anticipated that 1926 will prove a record year for the Ohmer Company.

Prize for Industrial Advertising Urged by Harvard Award

Recommendation for the establishment of an award for the best advertising campaign of industrial products was made on Feb. 22 by the jury of awards of the Harvard Advertising Awards, founded by Edward W. Bok. At the same time the names of the winners of awards already established in 1925 were announced by Wallace B. Donham, dean of the Harvard Business School. The annual award consists of cash prizes totaling \$11,000 and a gold medal. The latter was awarded to Ernest E. Calkins, president of Calkins & Holden, Inc., New York advertising agency, for distinguished personal service to advertising.

Cash awards cover various phases of the advertising field, such as the national campaign most excellent in planning and execution; the most excellent local campaign of a manufacturer; research and development of an index of effective buying power for consumers by counties in the United States; distinguished individual advertisements, etc. It is significant that the jury of awards felt it advisable to recommend an additional award to stimulate excellence in industrial advertising.

The adoption of this recommendation would naturally mean a reapportionment of awards in existence at the present time.

Pennsylvania Orders Electric Passenger Locomotives

Contracts on all the motive machinery, controls and other electrical equipment for six large electric passenger locomotives and two double-cab switching locomotives have been awarded by the Pennsylvania Railroad to the Westinghouse Electric & Manufacturing Company. This equipment will be shipped to the Juniata shops of the Pennsylvania Railroad at Altoona, where the entire group of eight locomotives is to be built.

The six passenger locomotives, which have a continuous rating of 3,730 hp. each, and compare as regards both tractive effort and speed with the greatest steam locomotives in existence, will be put into operation in the New York division hauling heavy passenger trains between the Pennsylvania Terminal, in New York City, and Manhattan Transfer. These locomotives are in addition to two others of a similar type placed in service at Manhattan Transfer in 1924.

Design of the new equipment was handled by the engineering staff of the motive power department, Pennsylvania Railroad, under the personal direction of its chief, J. T. Wallis. The passenger units have a 2—8—2 wheel arrangement with a so-called "steep" type cab construction. Motors are arranged two per jack shaft, and are mounted outside, and at either end, of

the driving wheelbase. Each jack shaft serves two pairs of drivers, the latter of which are 80 in. in diameter, or approximately 1 ft. higher than the average man. The connection between the motors and the jack shaft is by means of pinions and flexible gears. The gear ratio of the locomotives will permit a sustained speed of 70 m.p.h. When delivered and ready for service each locomotive will weigh approximately 400,000 lb., with a total length of 68 ft.

The two electric switching locomotives are of the so-called double-cab type for general yard work, of which quite a number already have been designed and ordered.

Purchase of Enormous Copper Smelter Announced

Hyman-Michaels Company, Chicago, Ill., announces the purchase through the United Commercial Company, San Francisco, of one of the largest copper smelters in the world. The purchase covers the Mammoth, Keystone and Kennett properties of the United States Smelting, Refining & Mining Company, located at Kennett, Cal. In addition to the plants, the purchase covers all personal properties, including a considerable amount of trackage and railroad equipment.

Pressed Steel Car Company Merges with Subsidiary

Stockholders of the Pressed Steel Car Company have approved the plan recently submitted by directors whereby a merger with Western Steel Car & Foundry, a subsidiary, will be effected and the company recapitalized. The name Pressed Steel Car will be continued. When the plan is consummated Pressed Steel Car Company will have an authorized capital of \$16,200,000, par value, cumulative 7 per cent preferred and \$46,300,000, par value, common stock, with outstanding issues of \$15,000,000 preferred and \$12,500,000 common.

Rolling Stock

Memphis Street Railway, Memphis, Tenn., has placed an order with the St. Louis Car Company, St. Louis, Mo., for 32 single-end cars, 46 ft. long.

Roanoke Railway & Electric Company, Roanoke, Va., an American Electric Power Company property, has ordered from the J. G. Brill Company six 28-ft. closed motor cars equipped with Brill 77-E trucks.

Tampa Electric Company, Tampa, Fla., has included in its 1926 budget the purchase of 25 double-truck cars. This item of the expansion program alone represents an expenditure in excess of \$300,000.

Worcester Consolidated Street Railway, Worcester, Mass., needs 77 new cars, according to a recent survey made there, to bring the rolling stock equipment up to present-day requirements. The proposal now made is for the use of light-weight one-man, two-man cars. Reference is made elsewhere in this issue to the survey under which this

fact and others with respect to service and equipment in Worcester were brought out.

Chileña de Electricidad, Santiago, Chile, has ordered from the Brill Company 30 28-ft. 3-in. closed car bodies to be equipped with Brill 177-E trucks.

Georgia Railway & Power Company, Atlanta, Ga., ordered in January of this year ten new one-man cars for its interurban line. The specifications of these cars follow:

Builder of car body.....	Cincinnati Car Company
Type of car.....	Single-end, double-truck interurban safety car for two-car train service
Seating capacity	51
Weights:	
Car body	18,000 lb.
Trucks	9,880 lb.
Equipment	8,365 lb.
Total	36,245 lb.
Bolster centers, length.....	26 ft. 3 in.
Length over all.....	45 ft. 6 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 4 in.
Height, rail to trolley base.....	11 ft. 8 in.
Body	All steel
Interior trim	Light mahogany
Headlining	Agasote
Roof	Arch
Air brakes	Safety Car Devices
Armature bearings.....	Sleeve General Electric
Axles.....	Brill Company Cambria hammered steel
Bumpers	Pressed steel
Car signal system.....	Faraday
Car trimmings.....	Bronze oxidized, Dayton
Center and side bearings.....	Brill, center bearings; Stucki, side bearings
Compressors.....	Western Traction Brake Company DII-16
Control.....	General Electric PC 5-K2
Couplers.....	Tomlinson, Form 10, car, air and electric
Curtain fixtures.....	Curtain Supply No. 90, pinch fixture, Rex rollers
Curtain material.....	Pantasote, grain Morocco, color No. 86
Destination signs.....	Keystone JRR and ILR
Door-operating mechanism.....	National Pneumatic
Energy-saving device.....	Economy meter
Fenders	H-B wheelguards
Gears and pinions.....	General Electric A-1
Hand brakes.....	Peacock staffless
Heater equipment	Unsettled
Headlights.....	Ohio Brass SDII roof type
Journal boxes	Brill
Lightning arresters.....	General Electric Aluminum A-11
Motors.....	Four GE-265-A, inside hung
Registers	Ohmer
Sanders	Ohio Brass, Form 2
Sash fixtures.....	Dayton wedge type
Seats.....	Hale & Kilburn 900A bucket type
Seating material.....	Genuine gray leather
Slaek adjuster.....	Amerlean automatic
Springs	Brill Company
Step treads	Aluminum, Cincinnati Car
Trolley retrievers.....	Knutson 5-B
Trolley base	Ohio Brass, Form 4
Trolley wheels.....	Nuttall 6 in. diameter
Trucks	Brill 177-E-1
Ventilators	Nichols-Lintern Company type C
Wheels	26 in. steel E-26-S
Special devices.....	Signal lights; push-button control of doors, variable load brake, compensating fixture dome lights

Metal, Coal and Material Prices

Metals—New York	Feb. 23, 1926
Copper, electrolytic, cents per lb.....	14.25
Copper, wire base, cents per lb.....	16.00
Lead, cents per lb.....	9.10
Zinc, cents per lb.....	8.07
Tin, Straits, cents per lb.....	64.75
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.....	\$4.875
Somerset mine run, Boston, net tons.....	2.10
Pittsburgh mine run, Pittsburgh, net tons.....	2.05
Franklin, Ill., screenings, Chicago, net tons.....	1.575
Central, Ill., screenings, Chicago, net tons.....	1.125
Kansas screenings, Kansas City, net tons.....	2.425
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.....	\$6.25
Weatherproof wire base, N. Y., cents per lb.....	17.75
Cement, Chicago, net prices, without bags.....	2.10
Linseed oil (5-bbl. lot), N. Y., cents per lb.....	11.60
White lead in oil (100-lb. keg), N. Y., cents per lb.....	15.50
Turpentine (bbl. lot), N. Y., per gal.....	\$9.98

Trade Notes

Kelly, Cooke & Company, Philadelphia, Pa., have announced a change in location for their headquarters. Formerly located at 424 Chestnut Street, they have now taken offices in the Insurance Company of North America Building, the Parkway at Sixteenth Street.

Leon L. Wolf, president of the Leon L. Wolf Waterproof Fabric Company, Cincinnati, Ohio, has announced the appointment of Edwin Besuden to be sales promotion manager. Mr. Besuden formerly was connected with the Jewett Motor Car Company. He is well known among electric railway men. He will spend most of his time in the field, further stimulating the widening market for Wolf Kemi-suede, the new waterproof material for upholstery purposes in the automotive and electric railway fields.

Farley Osgood, for many years prominently identified with the electric light and power industry, has established consulting engineering offices in the National Bank of Commerce Building, New York. He will engage more particularly in the design, construction, operation and interconnection of public utilities. Mr. Osgood has been especially active in the affairs of the American Institute of Electrical Engineers and was signally honored with the presidency in 1924-1925. He is widely known as a remarkably able engineer.

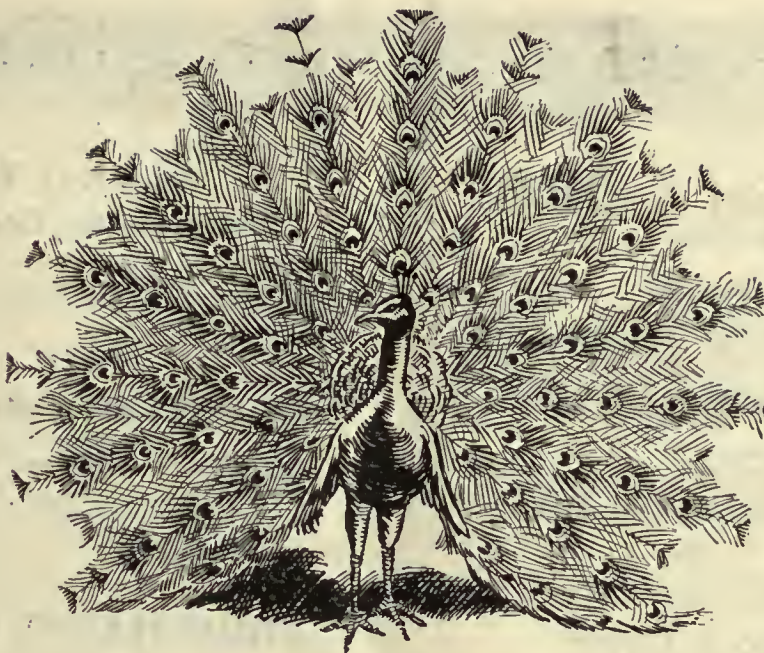
Reo Motor Car Company, Lansing, Mich., states that, exclusive of administrative expenses, a fleet of six Reo 21-passenger six-cylinder model W buses has been operated in South Bend, Ind., at a cost of only 8½ cents per bus-mile by the Chicago, South Bend & Northern Indiana Railway. Information as to operating costs was obtained from a statement recently made by George R. Green, general superintendent of the railroad. The fleet has been in operation since February, 1925.

New Advertising Literature

Electric Controller & Manufacturing Company, Cleveland, Ohio, has issued a leaflet which illustrates various applications for E, C & M separator magnets. Installation methods are also treated. Copies will gladly be supplied on request.

Metallo Gasket Company, New Brunswick, N. J., has issued catalog No. 26, entitled "Metallo Gaskets." In this are described various types of gaskets for use in pipe joints, air pumps, boilers, hand hose, and wherever else this equipment may be required. Gaskets for high and low pressure work and for ordinary and extreme conditions are available.

Korfund Company, Inc., New York, N. Y., has issued a bulletin entitled "How to Isolate Machine Vibrations." This points out the disadvantages of attempting to operate machinery without adequate protection from size and vibration, and states that Korfund plates of coarse natural cork are admirably adapted to meet these problems.



Solving the safety problem on modern, light-weight cars—

An important part of the modernization program calls for increased safety on the new cars that the industry is now discussing. The solution to this safety feature can be readily found in Peacock Staffless Brakes.

Their 144-inch chain winding capacity provides tremendous braking power regardless of the worn condition of brake shoes or the looseness of brake rigging.

Minimum floor space required, simplicity of operation and low installation and maintenance costs are further reasons for the use of Peacock Staffless Brakes on all your cars.

Ask for further proof of Peacock performance in the form of actual facts and figures.

National Brake Co., Inc.

890 Ellicott Sq., Buffalo, N. Y.

Canadian Representative

Lyman Tube & Supply Company, Limited, Montreal, Canada



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Staffless**

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EXAMINATIONS REPORTS APPRAISALS

ON

INDUSTRIAL AND PUBLIC SERVICE PROPERTIES

New York

Boston

Chicago

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For the first day or so the field in a six-day race keeps well bunched together. But the gruelling contest quickly weeds out the weaker members, for Old Man Wear-an-Tear sets a terrific pace.

The result by the end of the third and fourth days is no longer in doubt. The Boyerized Boy, showing no signs of fatigue, leads the pack by many laps. Even the veteran Wear-an-Tear is badly out-distanced.

To quote a famous sporting writer—"The Boyerized Boy wins in a breeze. He is easily three to four times better than any of the others."

That's the kind of enviable reputation being hung up by all Boyerized Parts.

Try them on your hardest jobs.

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Transfer the costly drudgery of load lifting to sturdy Ford Chain Hoists. Keep your mechanics at the job they are paid to do.

When large public utilities and railroads choose these hoists for their work, it is a choice based on confidence—established by proved records of performance. It is visible recognition of the merit possessed by Ford Chain Hoists.

There are many types of Ford Hoists. The best known and most widely used is the TRIBLOC. This type is a spur geared chain hoist, 80% efficient, and the strongest and most compact chain hoist made. It is made in all sizes from $\frac{1}{4}$ ton to 20 tons, and equipped with Roller Bearing Trolleys

when required for applications like that shown above.

The Screw Geared Hoist is frequently preferred for portable use because it is lighter in weight than the TRIBLOC. A bronze gear and steel worm operating in an oil-tight housing provide a smooth working and powerful hoisting arrangement that has a long life. This hoist is made in sizes from $\frac{1}{2}$ ton to 10 tons.

The Differential Hoist is best suited for occasional lifting of light loads. It is made in sizes from $\frac{1}{4}$ ton to 3 tons.

There are other types of Ford Hoists we should like to tell you about, both standard and special. Many are described in our catalog which is sent on request. Just ask for Catalog 7-B, or if you have special conditions, we shall be glad to make recommendations.

FORD CHAIN BLOCK COMPANY
2nd and Diamond Sts.

Philadelphia, Pa.

We also manufacture "THE MOTORBLOC" an electrically driven portable chain hoist

That 5th Important Element in Bus Operating Costs

—How the low first cost and long life of the Studebaker Bus Chassis reduces it

THERE are four primary factors of operating cost in bus transportation: (1) gasoline, (2) oil, (3) tires, (4) repairs.

But there is a fifth—often disregarded, but unavoidable and therefore important. This is depreciation cost—a factor which varies according to the amount of first cost and the mileage a bus delivers.

This factor has been most carefully considered in the designing and building of the Studebaker Bus Chassis. Tremendous mileage is built-in to render unexcelled service.

Every Studebaker Bus Chassis is capable of delivering a minimum of 150,000 miles of dependable, low-cost service. This is proved by numerous instances in which Studebaker Bus Chassis have delivered upwards of 200,000 miles of service and are still profitable operating units.

Since no other bus chassis can excel the Studebaker Bus Chassis in length of service, it is certain the *depreciation cost of a Studebaker chassis per year is less*. For it equals any other bus chassis in strength. Yet it costs 50% less than the average bus.

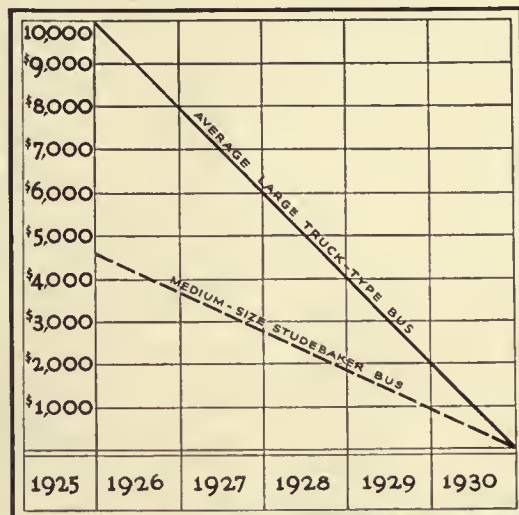
Compare, for instance, the Studebaker 19-passenger cross seat sedan costing \$4900 with the average large truck-type unit costing \$10,500. (Seating capacity has no bearing in this comparison.)

L
—first cost
—depreciation cost
—maintenance cost
—operating cost
Lower

The expensive truck-type chassis is no sturdier, nor is it capable of giving longer service.

For depreciation, let us allow 20% on both chassis—(a conservative figure, for many fleet operators allow up to 33⅓%).

With the Studebaker Bus



Depreciation cost figures at 20%



this means \$980 per year depreciation cost which is just as much a part of operating cost as gas, oil, tires, etc.

With the large, truck-type bus, the depreciation cost is \$2,100 per year.

Again let us say each of the busses averages 50,000 miles per year.

This means a depreciation cost on the Studebaker Bus, amounting to only .0196 per mile.

On the large truck-type chassis, the depreciation cost is .042 per mile.

There is thus no question that the Studebaker Bus Chassis is much lower in depreciation cost than the average bus chassis. As a result, it insures a larger margin of profits during the five years over which depreciation costs are usually figured. This explains why operators all over the United States are buying the Studebaker chassis in preference to large truck-type bus chassis.

STUDEBAKER BUS CHASSIS

Ashland, O., Operator reports 108,500 miles—\$14.04 for Repairs

Speaking of his Studebaker Bus, purchased in 1924, W.L. Newcomer, Ashland, Ohio, comments as follows:

"Running between Ashland and Wellington, I have now driven this bus 108,500 miles. The only parts which have been replaced on account of wear are a

set of piston rings, \$6.72, one-half of an axle shaft, \$6.00, and a distributor base plate, \$1.32. The original wrist pins and bushings are still in the motor. I have had the valves ground four times. The brakes have been relined twice. I have never missed a trip or been held up a minute from any fault of the car."

"I Have Made More Money with Studebaker Equipment"

—Writes H. A. Chase, Montana Operator

H. A. Chase, who operates three Studebaker busses between Missoula, Polson and Hamilton, Mont., writes:

"My Studebaker busses are averaging 156 miles per day. I get from 14,000 to 16,000 miles to the set of tires; from 13 to 15 miles per gallon of gas; 1200 miles per gallon of oil; 22,000 miles on a set of brake lining.

"Routes are through the Rocky Mountains, one of our hills being $7\frac{1}{2}$ miles long and another $3\frac{1}{2}$ miles long. But we seldom have to shift into intermediate gear. There is always power to spare in the Studebaker.

"Regardless of weather or road conditions, my busses have never left the depot late and always pull in on time, due to the kind of equipment Studebaker sells and the service I get from your local dealer, who is always on the job, day or night.

"My busses are overloaded practically all the time. Passengers are always commenting on the comfort and dependability.

"I have made more money in the last eight months with my new Studebaker equipment than I have in the last three years. There is money in the bus business, if you purchase Studebakers."

THE 15-Passenger Sedan-type Bus, illustrated below, is mounted on a specially designed Studebaker chassis of 158-inch wheelbase.

Engine is the most powerful of any bus chassis of its size in the world, according to the rating of the Society of Automotive Engineers.

Extra safety factors include: staunch frame braced by eight stout cross-members; large rear axle shaft; over-size propeller shaft; sturdy, resilient springs; special disc bus wheels.

Body is 167 inches long by 76 inches wide. Finish is rich, durable lacquer. Three doors on the right side provide convenient entrance and exit for passengers. Seat cushions and backs of seats are upholstered in genuine leather. Six ventilators, adjustable windows, dome lights, roller window shades and an exhaust heating system. Baggage rack under the third tier of seats; additional luggage accommodation under seats and on the roof.

Equipment includes: stop signal system; illuminated destination sign box; automatic windshield cleaner; rear-view mirror; front and rear bumpers; motometer; extra wheel, tire and tube with carrier mounted on left front fender; 8-day clock and gasoline gauge, plus the usual instruments; lights controlled by steering wheel switch.

Write for full details of this 15-Passenger Studebaker Bus. Mail the coupon below.

The Studebaker 15-Passenger Sedan-Type Bus

\$4035 f. o. b. factory

Including extra wheel with tire and tube



NOW FREE:

Mail coupon at right and obtain free a copy of our unique booklet, "Profitable Bus Operation." It contains facts and figures of vital interest to every bus owner.

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Address

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How many busses have you at present?

Check below the Studebaker Bus about which you desire information.

Type: Sedan..... Parlor Car..... Street-Car Type.....

Capacity:..... Passengers.

Five Body Designs 12 to 21 Passengers

\$3785 to \$5575

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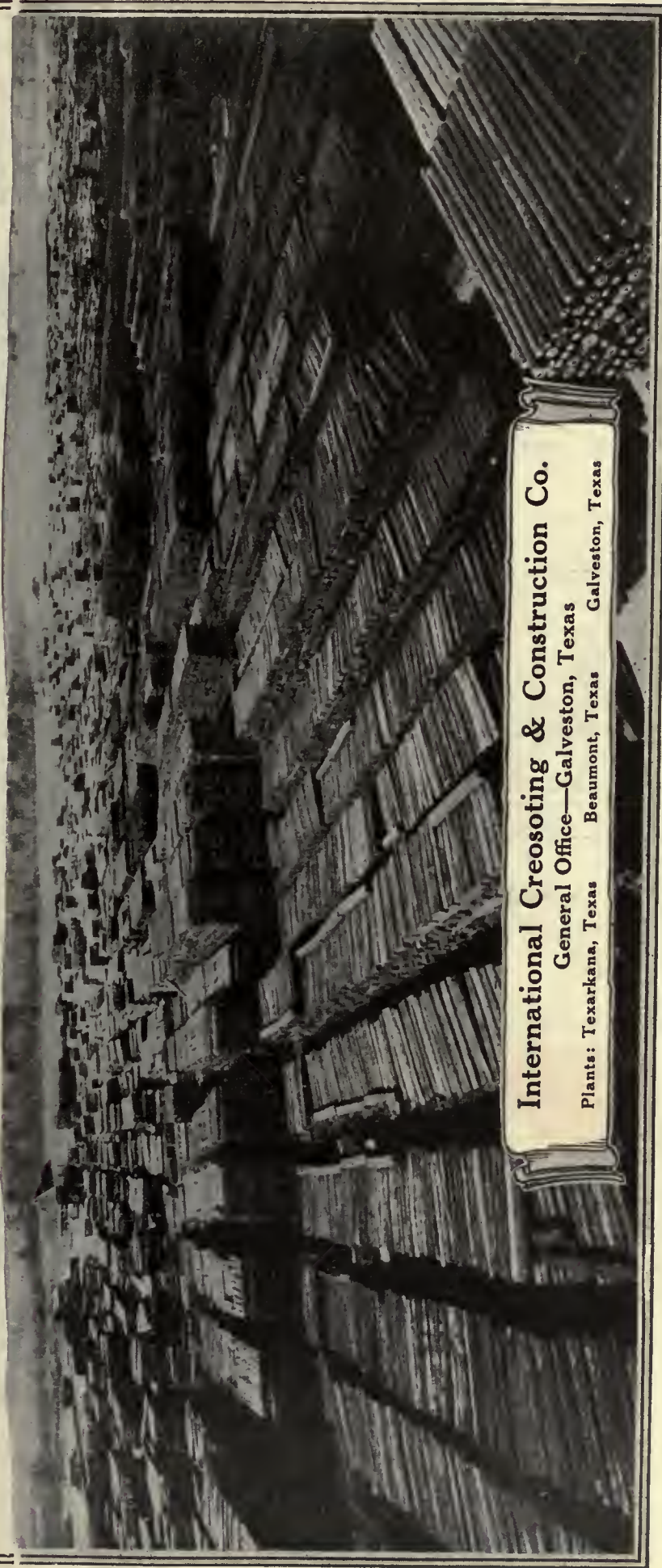
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Such service insures the right kind of ties at the right place at the right time, at a considerable saving per tie.

Just phone, wire, or write your requirements. Even a check inspection is not absolutely necessary—for no more exacting enforcement of specifications is known in the tie industry than that practiced at *International* Plants.



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“With RAIL maintenance



*Al. A. Oldfield, Engineer of Maintenance of Way,
Wisconsin Power & Light Co., Fond du Lac, Wis. Mr.
Oldfield is numbered among the best known railway
engineers in the country.*

FILLER

costs will be decreased"

"Two years ago, in a paper read before the Wisconsin Utilities Association in Milwaukee," says Alf A. Oldfield, a leading street railway engineer, "I made the statement that it seemed likely that we would have to avoid the use of concrete in city track zones. But since that time we have made great strides in the development of resilient track, and consequently my idea does not hold.

"About the time that we changed from flexible types of pavement to concrete, we also began the use of ties of steel construction.

"Finally the welded joint and mechanical tie were developed. We used a mechanical tie having asphaltic filler, which provides the necessary resiliency. While this was a great advancement, we found it desirable to keep the rail from having direct contact with the concrete between ties. And for this purpose we

have adopted Carey Elastite Rail Filler. Our decision was reached after a six months' test on two stretches of track, one with and one without rail filler.

"Personally, I am convinced that concrete pavement in city track zones with rail filler will be found much more satisfactory, and that maintenance costs will be considerably decreased."

* * * * *

Carey Elastite Rail Filler is a mastic compound of asphalt and fiber. It comes in ready-formed slabs shaped to fit any type of rail. A tap with a mallet puts the strip into place. It forms a resilient cushion for the rail, which absorbs traffic impact and reduces noise. Unaffected by moisture or changes in temperature. The very small amount it adds to construction costs is insignificant compared with the saving in maintenance costs which results. Write for full details.

The PHILIP CAREY COMPANY, Lockland, Cincinnati, O.

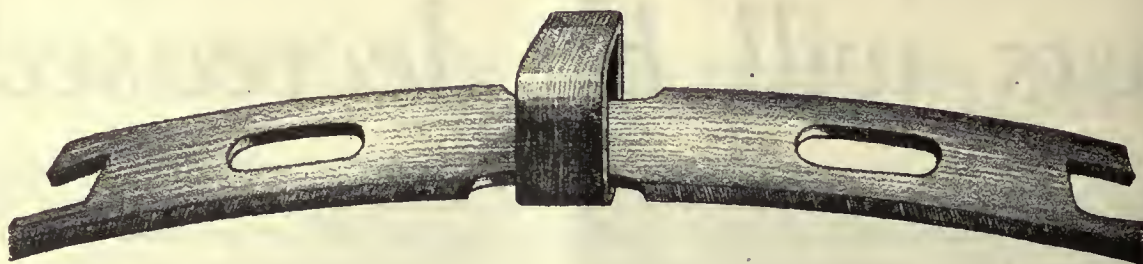


A view of the track system of the Wisconsin Power & Light Co. at Sheboygan, Wis. This shows the type of track construction together with the use of Carey Elastite Rail Filler which was being set in place when the photograph was taken.

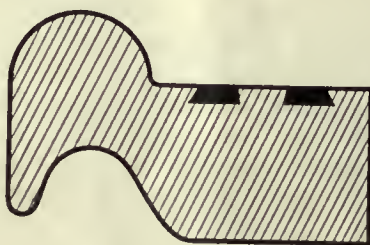
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**SYSTEM OF
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Are Your Steel Backs *Bevelled*?



The steel back of a brake shoe fails as reinforcement if it pulls out of the shoe body. In American Brake Shoes, therefore, the steel reinforcement plates are rolled with bevelled edges. These edges take a dove-tailed grip upon the metal of the shoe and anchor shoe metal and reinforcing plate together. Would you trust a reinforcing beam which simply was laid *next* to the body it supports without some bond to hold the two together?

"BEST BY TEST"

**THE AMERICAN BRAKE SHOE
& FOUNDRY COMPANY**

30 CHURCH ST., NEW YORK
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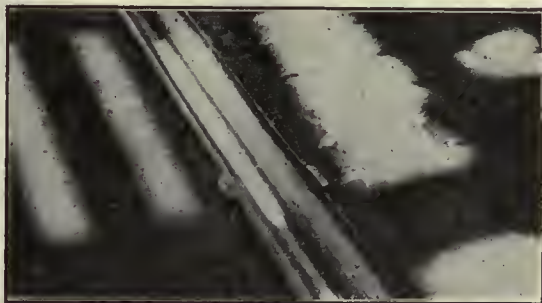
What do rail joints cost ?

First cost is only one consideration

Maintenance makes many a welded joint cost several times its original price in a few short years. Surrounded by expensive paving, the first sign of looseness or cupping in a joint is the beginning of trouble and costly repair work.

Thermit Welds are now installed at prices no higher than any other method of joining rails. But instead of merely welding a joint, this process makes a solid rail. There is no longer any joint to be maintained.

The first cost of a Thermit Weld is the last cost.



Installed 1912
No maintenance since

This Thermit Weld has been in service in one of New York's heaviest traffic streets for fourteen years. Thousands of such welds have been in like service, under similar conditions for long periods. They have proved that Thermit Welds require no maintenance and last as long as the rail itself.



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CONSIDER what a tremendous saving in rolling-stock upkeep and track and foundation maintenance that represents (the shock- and vibration-absorbing features makes it a sure thing), and try to estimate the value of the good-will that has been built up by the relative silence of traffic operated over all that Dayton Tie track. Then consider how this saving is going to continue piling up in the years to come, throughout the long maintenance-free life of Dayton Tie tracks.

Others—many others—have considered this and are profiting by it to an increasing extent every year.

Except for good-will (you can figure that at whatever you wish) the actual figures are available on case after case, in cities of every character. Every detail is yours for the asking.

**DAY
RESILI**

The Dayton Mechanical
DAYTON,

More Than 2800 Average City Blocks of Street Railway Track is laid upon Dayton Resilient (Shock-Absorbing) Ties



DAYTON RESILIENT TIES

The Dayton Tie Company ~ ~ ~
OHIO

Bethlehem Track Specialties



Railbound Manganese Hard Center
Frog, Design 951.

BETHLEHEM manufactures a complete line of Electric Railway track specialties.

The three illustrated products are of the railbound hard center type, and are made to withstand extreme traffic conditions. The manganese steel centers are accurately ground to fit the rail. The parts of the frog, switch and mate are bolted together with heat-treated Mayari chrome-nickel bolts.

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Railbound Manganese Hard Center
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Design 526.

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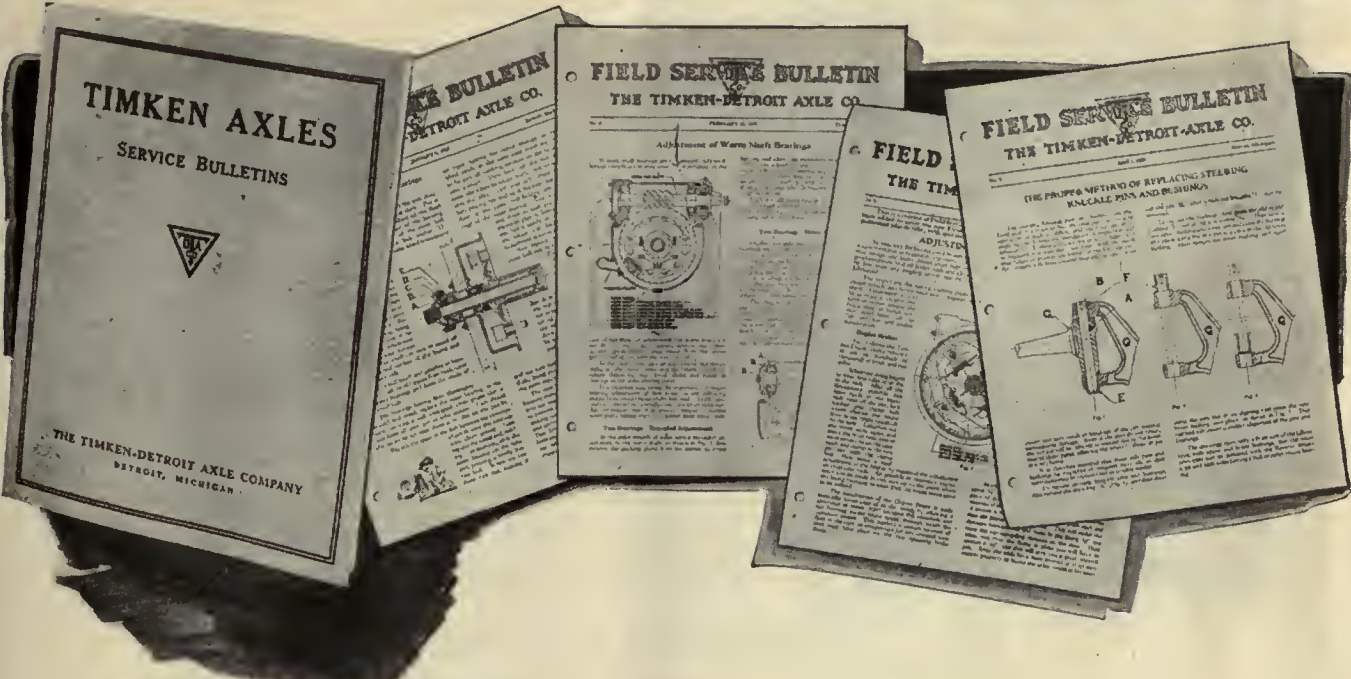
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Floating Type. (4) Adjustment of Rear Wheel Bearings—Fixed Hub Type. (5) Adjustment of Thrust Bearings on Steering Knuckle Pins. (6) Adjustment of Worm Shaft Bearings. (7) Adjustment of Differential Bearings and Worm Gearing. (8) Adjusting and Relining Brakes. (9) Replacing Steering Knuckle Pins and Bushings. (10) Lubrication.

Let us know how many copies you can use



THE TIMKEN-DETROIT AXLE CO., DETROIT, MICH.

AXLES



2098 consists mostly of 99.8% pure Gilsonite, fluxed with other bitumens. The natural oils of the materials used volatilize only at temperatures produced by artificial heat and the flexibility, or life, of the coating may be depended upon to endure for a longer period than that attained by mixtures of oil, gum and pigment.

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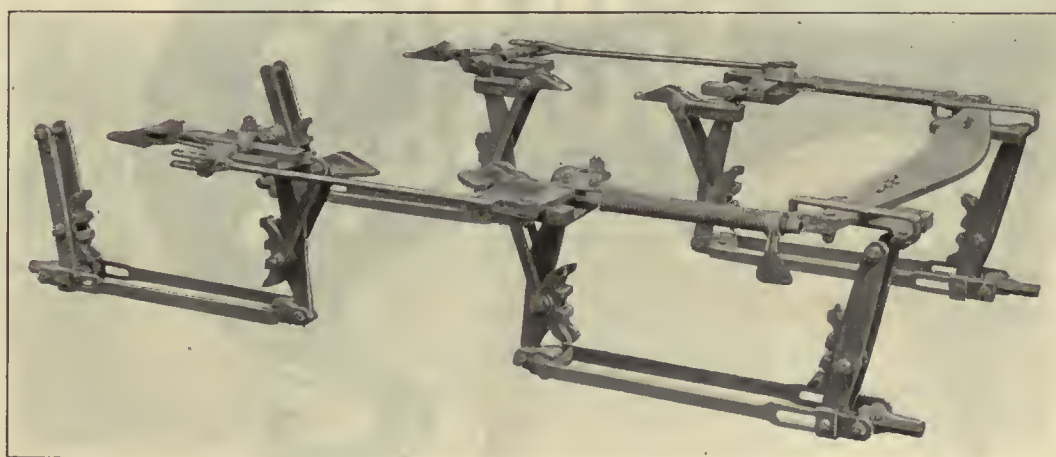
SHORT SMOOTH STOPS

with

AMERICAN CLASP BRAKES

for

MULTIPLE UNIT EQUIPMENT



REDUCE THESE TROUBLES

Hot Boxes

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Slid-Flat Wheels

Shocks and Hard Riding

Excessive Brake Shoe Wear

SIMPLEX CLASP BRAKES *Eliminate*

Journal Disturbances Which Cause Hot Boxes

Dragging Shoes and Stuck Brakes which cause Heavy Train Resistance and Slid-Flat Wheels.

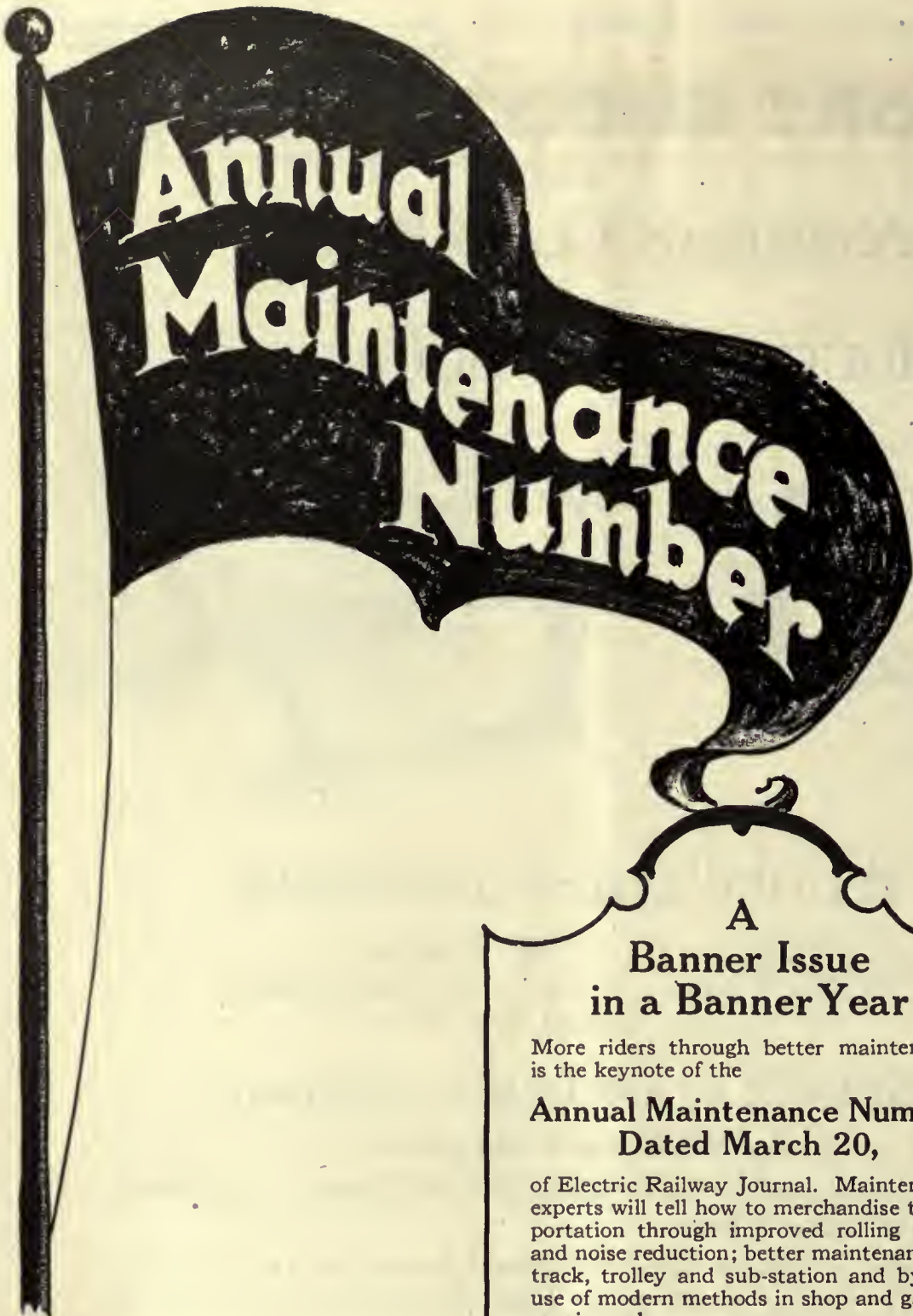
Heavy Shoe Pressures and Unbalanced Loads on Truck Frames and Truck Springs which cause Hard Riding, Shocks, and High Brake Shoe Maintenance Costs.

AMERICAN STEEL FOUNDRIES

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Annual Maintenance Number

A Banner Issue in a Banner Year

More riders through better maintenance is the keynote of the

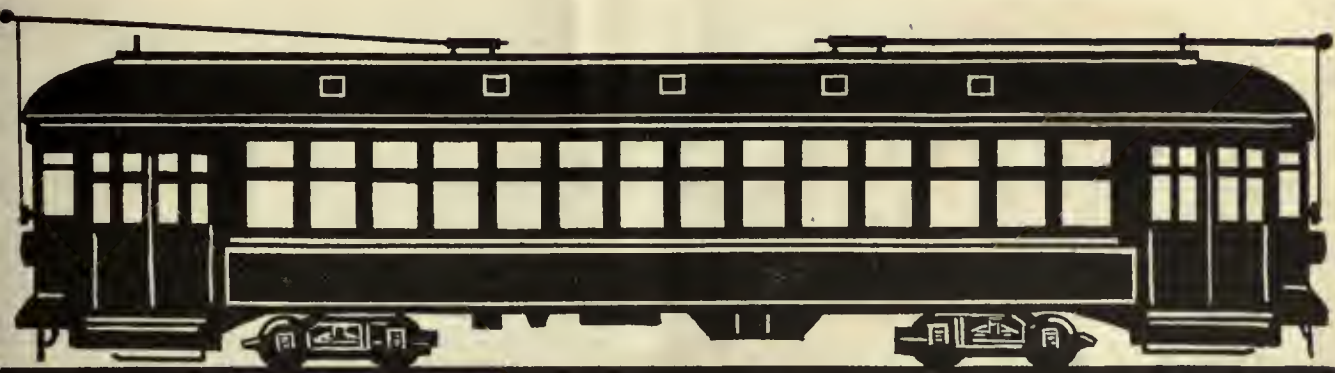
**Annual Maintenance Number
Dated March 20,**

of Electric Railway Journal. Maintenance experts will tell how to merchandise transportation through improved rolling stock and noise reduction; better maintenance of track, trolley and sub-station and by the use of modern methods in shop and garage repair work.

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Electric Railway Journal



Service represents one of the reasons why electric railways in steadily increasing numbers are using Gary Wrought Steel Wheels. Central plant location assures prompt delivery after shipment. Long association with railroad requirements guarantees intelligent and painstaking handling of orders.

Of themselves, these considerations would be insufficient, perhaps, to be of deciding influence. Added, however, to the manner in which the quality of Gary Steel Wheels is guarded from ore mine to finished product, they help to explain the favor that Gary Wheels enjoy.

Illinois Steel Company

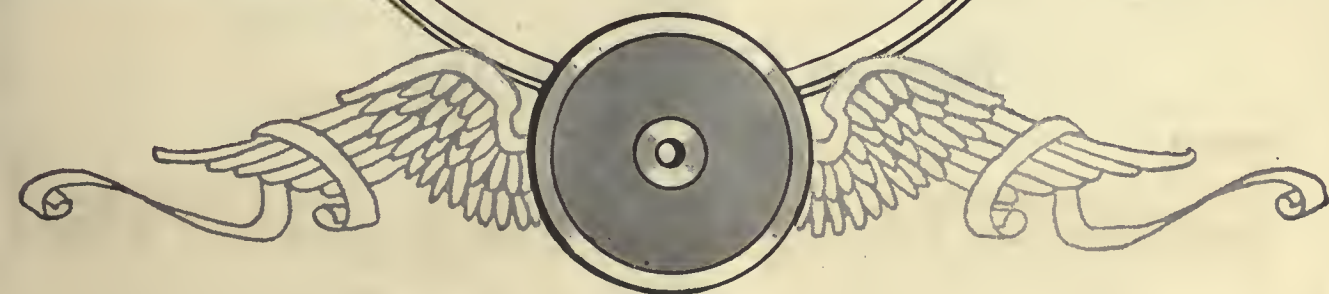
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A nation-wide
organization
building and
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New York

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It's always a bit crowded in the rear. Those who are "up forward" have "elbow room."

The Johnson Electrical Full Automatic Fare Box, which registers every fare instantly, audibly and visibly, is a decided step forward.

The new Johnson "J" Box possesses a leadership that is undisputed, because it gives a service that is unrivaled through an economy that is unmatched.

Fifteen years of fare collection box experience, plus skillful designing, plus ingenious ideas, plus honest workmanship, has produced this Fare Box which promotes the plane of Fare Collection to a higher degree of efficiency.

To keep up with progress, "MOVE FORWARD, PLEASE!"

JOHNSON FARE BOX CO.

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4619 Ravenswood Ave.

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980 Eighth Avenue



Griffin Wheel Company

410 North Michigan Ave.
Chicago, Ill.

GRIFFIN F. C. S. WHEELS

For Street and Interurban
Railways

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Detroit
Denver

Boston
Kansas City
Council Bluffs

St. Paul
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Tacoma

You're having brush trouble
CORRECT IT

USE LE CARBONE CARBON BRUSHES

They talk for themselves

COST MORE PER BRUSH
COST LESS PER CAR MILE

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Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.

Pittsburgh Office: 634 Wabash Bldg.
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"Tool Steel"
helical gears
are

Quiet on the start
and

Continue Quiet
because

They don't wear.

BUY THE BEST

The Tool Steel Gear and Pinion Co.
CINCINNATI, OHIO

M-J Armature Babbitt



No less than twenty-five different grades of Babbitt have been successfully perfected in the More-Jones line, designed for various services and at varying prices. "Armature" for electric railways is the recognized standard. *Let us quote you.*

More-Jones Brass & Metal Co.
St. Louis, Mo.

**MORE-JONES
QUALITY PRODUCTS**



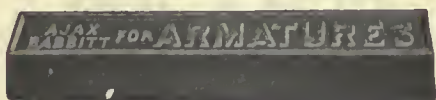
Cold Dinners
for your passengers?

Not if you use

AJAX

BABBITT for ARMATURES

keeps the rolling stock rolling



The Ajax Metal Company

Established 1880

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NEW YORK

CHICAGO

BOSTON

CLEVELAND

The DIFFERENTIAL CAR



**Standard on
60 Railways for**

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
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Hauling Cross Ties
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Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
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THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

SPECIALISTS

in the

**Design and Manufacture
of**

**Standard—Insulated—and
Compromise Rail Joints**

The Rail Joint Company
61 Broadway, New York City

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of
Water Tube Boilers
of continuing reliability

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PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building



WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters
since 1898 and of Chain Grate
Stokers since 1893

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NEW ORLEANS, 521-5 Baronne Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

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AND ALL OTHER TYPES

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American Steel & Wire Company

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U. S. Steel Products Co.
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Special Track Work of every
description

THE BUDA COMPANY

Harvey (Suburb Chicago) Illinois

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W. C. PETERS, Manager Sales and Engineering

National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York
Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago.

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Walter Tractor Snow Plows Varnishes, Enamels, etc.
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Flaxlinum Insulation Anderson Slack Adjusters
Yellow Coach Mfg. Co.'s Single Feasible Drop Brake Staffs
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B. G. Spark Plugs

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

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Johnstown, Pa.

Sales Offices:

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Los Angeles Portland San Francisco Seattle
Expert Representative:
United States Steel Products Company, New York, N. Y.

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TRACKWORK

Switches, Mates, Frogs
Complete layouts of all kinds
Made by the originators of
Manganese Trackwork
Wm. Wharton Jr. & Co., Inc.
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"The Standard for Rubber Insulation"

INSULATED WIRES and CABLES

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The Okonite-Callender Cable Company, Inc.

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PATERSON, N. J.

Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta
Birmingham San Francisco Los Angeles Seattle



Pettingell-Andrews Co., Boston, Mass.

F. D. Lawrence Electric Co., Cincinnati, O.

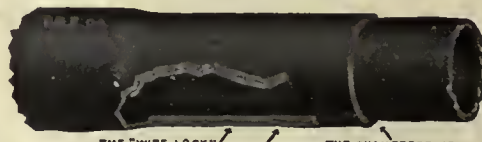
Novelty Electric Co., Phila., Pa.

Gen. Rep.: Engineering Materials Limited, Montreal.

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COMBINE

Lowest Cost

Least Maintenance

Lightest Weight

Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO

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Waterproofed Trolley Cord



Is the finest cord that science and skill can produce.
Its wearing qualities are unsurpassed.

FOR POSITIVE SATISFACTION ORDER
SILVER LAKE

If you are not familiar with the quality you will be
surprised at its **ENDURANCE** and **ECONOMY**.

Sold by Net Weights and Full Lengths

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Manufacturers of bell, signal and other cords.

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Black and Yellow
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Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.

Irvington, N. J.

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WEATHERPROOF WIRE
AND CABLE

PAPER INSULATED
UNDERGROUND CABLE

MAGNET WIRE

Reg. U. S. Pat. Office

Incandescent Lamp Cord

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Boston, 116 Federal; Chicago, 113 W. Adams;
Cincinnati, Tracton Bldg.; New York, 100 E. 43rd St.

STANDARD

Wires, Cables, Cable Accessories
Superior quality, economical prices
Standard Underground Cable Co.
Boston Philadelphia Pittsburgh Detroit
New York Washington Chicago St. Louis
San Francisco



Chapman
Automatic Signals
Charles N. Wood Co., Boston



ANACONDA TROLLEY WIRE

ANACONDA COPPER MINING COMPANY
THE AMERICAN BRASS COMPANY

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NEW YORK CHICAGO

AUTOMATIC SIGNALS

Highway Crossing Bells
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Flasher Relays

NACHOD SIGNAL COMPANY, INC.
LOUISVILLE, KENTUCKY.



AUTOMATIC BLOCK SIGNALS

for single track and stub end protection

United States Electric Signal Co.

Louisville, Kentucky



SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.

Made of extra quality stock firmly braided and smoothly finished.
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.

SAMSON CORDAGE WORKS, BOSTON, MASS.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge \$2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....\$4.50 an inch

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8 to 14 inches.....4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

E R J

POSITIONS WANTED

AS supervisor of welding, grinding and bonding. Nine years' experience both as traveling demonstrator, and in supervising joint and surface welding, grinding, bonding, shop-welding and apparatus repairs on both city and interurban properties. Can guarantee to get highest results in economy and performance. Location immaterial. Available about April 15. PW-883, Electric Railway Journal, Tenth Ave. at 36th St., New York.

ENGINEER, 24 years' experience in electric railway rolling stock maintenance and transportation supervision, open for position. PW-879, Electric Railway Journal, Tenth Ave. at 36th St., New York.

SUPERINTENDENT of transportation, shop, track and overhead on large property operating both city and interurban rail and coach service, desires change for personal reasons. Connected now with the same company that trained me. Correspondence invited. PW-885, Electric Railway Journal, 883 Mission St., San Francisco, California.

BOOKS AND PERIODICALS

For Sale

25 years' unbound copies Electric Railway Journal, \$50. B&P-880, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

WANTED

Hydraulic Pinion Puller

I—Second-hand. State size, number of jaws and price of complete outfit.

NORTHEAST OKLAHOMA RAILROAD CO.
Miami, Okla.

FOR SALE

30 Birney Safety Cars

Brill Built

West. 508 or G. E. 284 Motors. Cars Complete—Low Price—Fine Condition.

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

TO HELP YOU

LOCATE COMPETENT MEN

"Searchlight" Advertising

G-3

Rails

We Buy and Sell

entire equipment of Electric Railways, including Rails, Cars, Wiring, Conduits, Etc.

Get Our Bids or Ask for Prices

Hyman-Michaels Company

Peoples Gas Bldg., Chicago
New York St. Louis Pittsburgh
San Francisco Dallas (78)

Master's Sale of Interurban Properties

STATE OF ILLINOIS } ss.:
Champaign County }

JOHN H. THORNBURN, Trustee,
Complainant.

vs.

KANKAKEE & URBANA TRACTION
COMPANY, a corporation, et al.

IN THE CIRCUIT COURT THEREOF,
In Chancery, January Term A. D. 1926.

No. 7546
FORECLOSURE.

Public notice is hereby given that in pursuance of a decree of Foreclosure made and entered in the above entitled cause on the 30th day of January, A. D. 1926, by said Court, I, Harry B. Boyer, Master in Chancery of said Court, will at the hour of 10:00 o'clock in the forenoon, on Saturday, the 27th day of March, A. D. 1926, at the North Door of the Court House in Urbana, Champaign County, Illinois, sell at public vendue to the highest and best bidder the following described property and premises mentioned in said Decree; viz,—

All of the property of the Kankakee & Urbana Traction Company of whatsoever kind or nature, whether real, personal or mixed, tangible or intangible, including the Right of Way of said Company from the City of Urbana, Illinois, to the City of Paxton, Illinois, and including all trackage, poles, wires and also all stations, and sub-stations of said Company and including all machinery, apparatus, equipment and instruments and all rolling stock and also all machinery, tools, apparatus or equipment of the trackage and rolling stock and all other property of every kind and nature, including all rights, franchises, leases, licenses, good will, credits and effects of the said Defendant, the Kankakee & Urbana Traction Company,—or so much thereof as will satisfy said Decree.

Said sale to be made subject to all taxes and assessments legally levied and assessed on said property.

TERMS AND CONDITIONS OF SALE:—Cash in hand on day of sale. Sale absolute on confirmation of Court and payment of purchase price, subject to all taxes and assessments aforesaid.

Dated this 20th day of February, A. D. 1926.

Clark & Noel, Solicitors for Complainant, Urbana, Ill.

Williamson & Winkelmann, and W. E. Gilmore, Solicitors for certain defendants, Urbana, Ill.

HARRY B. BOYER,
Master in Chancery, Champaign, Ill.

"Opportunity" Advertising:

Think "SEARCHLIGHT" First!

G-02

TEN

High Grade, 38 PASSENGER
PAY-AS-ENTER CARS
in first class operating condition

Built by Cincinnati Car Company. Particularly desirable for one or two-man operation. Length over all, 43 ft. 6 in. Height over trolley board, 11 ft. 9 in. Height over all, 12½ ft. Number of seats, 13 across, 4 long. Type of motors, two G.E. number 87. Make of trucks, Brill. Wheel base, 4 ft. 11 in. Two controllers, types K-36-F and K-36-J. Air compressor. Westinghouse D-I-E-G with capacity of 14.5 cu ft. General condition of these cars is exceptionally good. All reasonably priced. Write for full particulars.



Also high grade, high speed, 48 and 56 passenger cars of the combination smoking and baggage section type. See advertisements in this publication, January 2nd and 30th for illustrations and descriptions, or write.

J. W. GERKE

"Railway Equipment"

303 Fifth Avenue,
New York City

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Westinghouse Air Brake Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Appraisals
Amer. Appraisal Co.

Armature Shop Tools
Elec. Service Supplies Co.

Asphalt Paint
Amer. Asphalt Paint Co.

Automatic Return Switch
Stands
Ramapo Ajax Corp.

Automatic Safety Switch
Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Dillino Steel Co.
Johnson & Co., J. R.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson, J. R.

Axles, Car Wheel
Bethlehem Steel Co.

Axles (Front & Rear) Motor
Truck and Passenger Car
Timken-Detroit Axle Co.

Axles, Steel
Carnegie Steel Co.
Johnson, J. R.

Axles, Trailer & Motor Bus
Timken-Detroit Axle Co.

Babbit Metal
More Jones Brass & Metal
Co.

Badges and Buttons
Elec. Service Supplies Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., The J. G., The
General Electric Co.
More Jones Brass & Metal
Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller
Side
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Consolidated Car Heat. Co.
Elec. Service Supplies Co.

Bodies, Bns
Auto Body Co.
Cummings Car & Coach Co.
Graham Bros.

Body Material, Haskellite and
Plymetil
Haskellite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Bolts & Nuts Track
Illinois Steel Co.

Bond Testers
American Steel & Wire Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Electric Railway Improve-
ment Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Electric Railway Improve-
ment Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Brackets and Cross Arms
(See also Poles, Ties,
Posts, Etc.)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
American Brake Shoe &
Fdry. Co.
Bemis Car Truck Co.
Brill Co., The J. G.

Brakes, Brake Systems and
Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
National Ry. Appliance Co.
Safety Car Devices Co.
Westinghouse Tr. Br. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Westinghouse E. & M. Co.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry
with Names of Manufacturers and Distributors Advertising in this Issue

Bulkheads
Haskellite Mfg. Corp.

Bus Seats
Bender Body Co.
Hale-Kilburn Co.
S. Karpen & Bros.

Buses, Motor
Brill Co., The J. G.
Cummings Car & Coach Co.
Garford Motor Truck Co.
Graham Brothers
International Motor Co.
Mack Trucks, Inc.
Studebaker Corp.
Yellow Coach Co.

Bushings, Cast Hardened
and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.

Cables. (See Wires and
Cables)

Cambria Tapes, Yellow and
Black Varnish
Irvington Varnish & Ins.
Co.

Carbon Brushes (See
Brushes, Carbon)

Cars, Dump
Brill Co., J. G., The
Differential Steel Car Co.

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Passenger, Freight,
Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co.

Cars, Gas, Rail
Brill Co., J. G., The

Cars, Second Hand
Electric Equipment Co.
Transit Equipment Co.

Cars, Self-Propelled
Brill Co., J. G., The
General Electric Co.

Castings, Brass Composition
or Copper
More-Jones Brass & Metal
Co.

Castings, Gray Iron and
Steel
American Brake Shoe &
Fdry. Co.
Bemis Car Truck Co.
Wm. Wharton, Jr. & Co.

Castings, Malleable and
Brass
American Brake Shoe &
Fdry. Co.
Bemis Car Truck Co.
Horne & Ebling Corp.

Catchers and Retainers,
Trolley
Driver-Harris Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Cellophane
Haskellite Mfg. Corp.
Pantaoite Co., Inc.

Cellophane, Plywood, Panels
Haskellite Mfg. Co.

Change Carriers
Cleveland Fare Box Co.
Elec. Service Supplies Co.

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for
Wires and Cables
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers Track
(See also Snow-Plows,
Sweepers and Brooms)
Brill Co., The J. G.
Root Spring Scraper Co.

Clusters and Sockets
General Electric Co.
Coal and Ash Handling (See
Conveying and Hoisting
Machinery)

Coll Banding and Winding
Machines
Elec. Service Supplies Co.

Coils, Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Licking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coins Counting Machines
Cleveland Fare Box Co.
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compounds (Insulating and
Splicing)
John-Manville, Inc.

Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.

Concrete Flooring Surface
Irving Iron Works

Condenser Papers
Irvington Varnish & Ins.
Co.

Condensers
General Electric Co.
Westinghouse E. & M. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

Copper Wire
Anaconda Copper Mining
Co.

Copper Wire Instruments,
Measuring, Testing and
Recording
American Steel & Wire Co.
Card, Bell, Trolley, Register
Brill Co., The J. G.
Elec. Service Supplies Co.
Roebling's Sons Co., John
A.

Sameon Cordage Works
Silver Lake Co.

Cord Connectors and
Couplers
Elec. Service Supplies Co.
Sameon Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing, Frog & Switch
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing, Track (See Track,
Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Morton Mfg. Co.

Pantaoite Co., Inc.

Dealer's Machinery & Second
Hand Equipment
Elec. Equipment Co.
Gerke, J. W.
Hyman-Michaels

Derailing Devices (See also
Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Servic, P. Edward

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heat. Co.
General Electric Co.
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.
St. Louis Car Co.

Doors & Door Fixtures
Brill Co., The J. G.
Consolidated Car Heat. Co.
Hale-Kilburn Co.
General Electric Co.
Morton Mfg. Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

Drills, Track
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.

Ears
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electrical Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.

Electric Grinders
Railway Track-work Co.
Western Electric Co.

Electrodes, Carbon
Railway Track-work Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Track-work Co.
Una Welding & Bonding Co.

Enamel
Lucas & Co., John

Engineers, Consulting, Con-
tracting and Operating
Allison & Co., J. S.
Archbold-Brady Co.
Beeler, John A.
Bibbins, Rowland J.
Buchanan & Layne Corp.
Bureau of Commercial
Economics, Inc.
Day & Zimmermann, Inc.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Kelly Cooke & Co.
McClellan & Junkersfeld
Railway Audit & Inspec-
tion Co.
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Corp., The
J. G.

Engines, Gas, Oil or Steam
Westinghouse E. & M. Co.

Exterior Side Panels
Haskellite Mfg. Corp.

Fans Boxes
Cleveland Fare Box Co.
Johnson Fare Box Co.
Perey Mfg. Co.
Nat'l Ry. Appliance Co.

Fare Registers
Elec. Service Supplies Co.
Ohmer Fare Register Co.

Fences, Woven Wire and
Fence Posts
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Consolidated Car Fender Co.
Root Spring Scraper Co.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Colls (See Colls)

Flangeway Guards, Steel
W. S. Godwin Co., Inc.

Floodlights
Elec. Service Supplies Co.

Floor, Snb
Haskellite Mfg. Corp.

Floors
Haskellite Mfg. Corp.

Forgings
Brill Co., J. G., The

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track
Work)

Frogs, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Funnell Castings
Wm. Wharton, Jr. & Co.,
Inc.

Fuses and Fuse Boxes
Consolidated Car Heat. Co.
General Electric Co.
Westinghouse E. & M. Co.

Fuses, Refillable
General Electric Co.
Gaskets
Westinghouse Tr. Br. Co.

Gas Producers
Westinghouse E. & M. Co.

Gas-Electric Cars
General Elec. Co.
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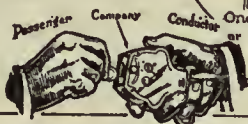
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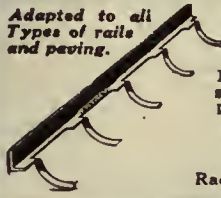


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MODERN CARS

Win in Coral Gables

Coral Gables quickly recognized the importance of modern electric railway car service to community development.

BRILL



Light-weight Double-track Safety Cars
Built by the American Car Co., St. Louis

Birney Safety Cars
Built by Brill



Bus equipment that's familiar

—it's electric

Railway mechanics and electrical equipment men prefer to care for gas-electric buses. They are familiar with the electrical equipment; they have a means of testing the engine—which is possible only with

Gas-Electric Drive
(for buses and trucks)



Consult the General Electric Company before you buy buses to be sure proper electrical equipment is applied. Best results are obtained only when service and grade conditions have been considered.

THE operation of buses naturally presents certain new problems to the railway operator. Therein lies a distinct advantage which the gas-electric bus offers to electric railways.

Gas-Electric Drive eliminates many of the difficulties of maintenance, which the ordinary gas bus may present. There is no clutch to care for. No gear

experts are needed because there are no transmission gears. The "rear end" problem is gone, because there is no differential, rear wheels being driven by standard direct-current electric motors.

The familiar tests and usual methods of maintenance are applicable to Gas-Electric bus drive, because it consists simply of generator, motors and control.

Maintenance Advantages

Inspection and testing of engine are simplified, made systematic and conclusive. Engine cannot be raced or stalled and average engine speed is lower—prolonging life of bearings, pistons, cams and all other moving parts. Clutch, gears and differential—all subject to high maintenance—are eliminated. Without the shock of gear changing, the life of engine, chassis and body is longer. Uniform torque of electric drive means less tire wear. Engine lubrication is materially less.

Operating Advantages

Greater riding comfort—no vibration or jerks during starting, and smooth acceleration. Increased safety—control entirely in foot pedal relieves operator's hands for steering—sliding is minimized by individual drive on rear wheels—engine cannot stall on dangerous crossings. Higher schedule speeds—through more rapid acceleration and reduction of driver fatigue—offording lower costs and higher receipts.



GENERAL ELECTRIC

